UNDERGROUND STORAGE TANK REMOVAL

Facility: James River Corporation
Address: Woodyard Scales
650 Main St. Berlin, NH 03570

Tank#: 18
Tank Volume: 1000 gallons
Contents: Heating Oil
Removal Date: August 16, 1994

Visual Inspection:

Wet soil was detected in the bottom of the pit which was believed to be from rainfall. No free water was visible. No visible soil contamination was found but there was a slight petroleum odor in sample 4A. The tank was in good condition with a slight amount of rust and no holes were detected. The piping and fittings also seemed to be free of leaks.

Olfactory Inspection:

VOC headspace analysis HNU PI101 10.2 eV PID

West side of tank (4A)	34 ppm
East side of tank (4B)	0.2 ppm

Removal Actions:

Two grab samples of soil were taken from the walls of the pit at approximately 4 feet deep in locations at each side of the tank.

Laboratory Results:

Sample	**4A**	**4B**
% Solids	90	89
TPH (dry basis)	2400	ND<100
BTEX	(see attached analytical results)	

Disposal:

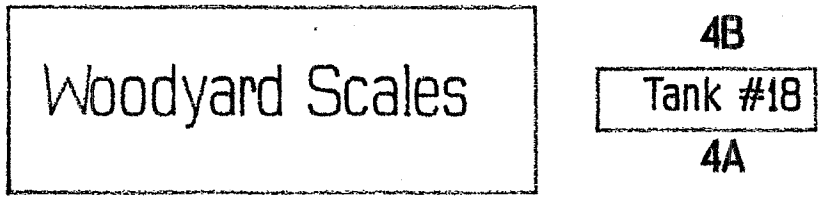
Due to heavy traffic in this area this pit was filled immediately after the tank was removed and samples were taken. The tank was inspected to ensure cleanliness and shipped to Isaacson Structural Steel for disposal as scrap metal.

Procedure based on:

UST Closure, Sampling and Reporting Guidelines June 1994

Interim Policy for Management of Soils Contaminated from Spills/Releases of Virgin Petroleum Products 9/91 and Amendment of 3/24/92.

State of New Hampshire regulations Part Env-Ws 411.



Numbers in Red Indicate Soil Sample Points

JAMES RIVER CORPORATION

INTEROFFICE CORRESPONDENCE

DATE September 13, 1994

TO Jeff O'Hearn - Berlin

FROM Dwight Easty - CES/Camas

SUBJECT Lab Reference 940411 - Analysis of Soil Samples

Results of analysis of soil samples collected 8/16/94 are shown in the enclosed tables.

Dilution factors shown in Table 1 pertain to the amounts of sample used for analysis. Detection limits for the target compounds in individual samples may be determined by multiplying the values in the Detection Limit column by the sample's dilution factor. Thus, for example, the detection limits for Sample 4A are 2.2 times the values in the Detection Limit column.

Methylene chloride found in almost all of the samples might represent contamination from the air in our laboratory. Soil samples were weighed on a balance in the lab, and they might have picked up contamination at that time. The lab blank contained only reagents and was not exposed to the air. If you wish, we could prepare a more representative blank by heating a soil to remove volatiles and then performing the analysis on that soil.

The initial amount of methylene chloride found in Sample 11, 32 µg/Kg, prompted us to analyze the sample a second time. The second analysis yielded a lower value, 6.1 µg/Kg, but it was performed two weeks beyond the holding time.

Please call if you have questions or wish us to perform additional analyses.

Dwight Easty

DWIGHT EASTY/jm

c: Earl Hanson - Richmond

Enclosures

Corporate Environmental Services-West
904 N.W. Drake Street, Camas, WA 98607-1999 (206) 834-4444

TABLE 1. EPA 8260 VOLATILE ORGANIC ANALYSES

Source: Berlin
Job No.: 940411
Sample: Soil Samples, 8-16-94

COMPOUND	Detection Limit*	Lab Blank	Concentration, ug/Kg(Dry Weight) 1A	1C	2A	2B	2C	4A	4B	11
Dilution factor		*1*	*0.92*	*2.16*	*0.96*	*2.74*	*0.86*	*2.2*	*0.85*	*0.86*
Percent Solids			*91*	*88*	*90*	*91*	*88*	*90*	*89*	*93*
Dichlorodifluoromethane	20	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	20	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	20	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	20	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	20	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	2	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	2	0.2b	2.5a	ND	6.1a	9.6a	5.5a	2.1a	1.1a	32, 6.1a
trans-1,2-Dichloroethene	2	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	2	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane	2	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	2	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	2	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene	2	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	2	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	2	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	3	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	7	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromomethane	4	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	2	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	1	ND	ND	ND	ND	ND	ND	1.3a	ND	ND
cis-1,3-Dichloropropene	2	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	3	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane	2	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	3	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	3	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 1. Continued

COMPOUND	Detection Limit*	Lab Blank	1A	1C	2A	2B	2C	4A	4B	11
1,2-Dibromoethane	3	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1,2-Tetrachloroethane	3	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
p-&m-Xylenes	2	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	2	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane	3	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromobenzene	2	ND	ND	ND	ND	ND	ND	ND	ND	ND
Propylbenzene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorotoluene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
tert-Butylbenzene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Isopropyltoluene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
n_Butylbenzene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	2	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	60	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	50	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	7	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	>100	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	>100	ND	ND	ND	ND	ND	ND	ND	ND	ND

*Estimated detection limit for 10g soil sample.
ND means not detected or less than the blank level.
a. Reported value is lower than the lowest calibration standard(12.5ug/Kg).
b. Reported value is lower than the lowest calibration std and the estimated detection limit.

Table 2

Analysis of Soil Samples: MTBE[a] and TPH[b]

Lab Reference 940411

Sample	Solids Content %	MTBE, ppm	TPH, µg/g (ppm) dry basis	
			As Gasoline	As Fuel Oil
1A	91	--	--	ND <10
1C	88	--	--	1100
2A	90	ND <0.1	ND <10	--
2B	91	ND <0.1	ND <10	--
2C	88	ND <0.1	ND <10	--
4A	90	--	--	2400
4B	89	--	--	ND <100
11	93	--	--	ND <100

[a] Methyl tert-Butyl Ether
[b] Total Petroleum Hydrocarbons

Note: Spike recovery of 2.5 ppm MTBE in soil: 87%

Methods:

MTBE and TPH as Gasoline - Extraction with methanol; purge-and-trap GC/MS analysis
TPH as Fuel Oil - Extraction with dichloromethane; analysis by GC/FID
Volatile Organics - EPA Method 8260

Analysts:

R. R. Claeys
K. J. Haunreiter
V. G. Claxton

JR

JAMES RIVER CORPORATION
COMMUNICATION PAPERS / N.E. GROUP
650 Main St., Berlin, NH 03570-2489 (603) 342-2000

September 29, 1994

Mr. Thomas Beaulieu
Groundwater Protection Bureau
NH Department of Environmental Services
6 Hazen Drive
Concord, NH 03302-0095

RE: UST Removal on August 16, 1994

Dear Mr. Beaulieu:

Enclosed please find a written report regarding the permanent closure of four underground storage tanks from our facility (O-112765) on August 16, 1994. The tanks were removed by James River personnel and witnessed by Nancy Kurseyicz from your office. Analytical data is included of the soil samples that were collected.

If there is any other information that you require please contact me at (603) 342-2363.

Sincerely,

Jeff O'Hearn
Environmental Project Engineer

ustrem94:ust1

cc: R. Danforth
B. Delisle - Berlin Health Department

JAMES RIVER CORPORATION
COMMUNICATION PAPERS / N.E. GROUP
650 Main St., Berlin, NH 03570-2469 (603) 342-2000

October 12, 1994

Mr. Carl Woodbury
Waste Management Division
NH Department of Environmental Services
6 Hazen Drive
Concord, NH 03301

Dear Mr. Woodbury:

Enclosed please find soil analytical data for approximately 5 yd^3 of soil resulting from the removal of a gasoline and a diesel underground storage tank at our Tractor shop. We are seeking your permission to dispose of this soil at our Mt. Carberry Landfill.

If you have any questions or concerns please contact me at (603) 342-2363.

Sincerely,

Jeffrey O'Hearn
Environmental Project Engineer

ts_ust_soil_101294:vwp_jdo

cc: R. Danforth

JAMES RIVER CORPORATION

INTEROFFICE CORRESPONDENCE

DATE September 13, 1994

TO Jeff O'Hearn - Berlin

FROM Dwight Easty - CES/Camas

SUBJECT Lab Reference 940411 - Analysis of Soil Samples

Results of analysis of soil samples collected 8/16/94 are shown in the enclosed tables.

Dilution factors shown in Table 1 pertain to the amounts of sample used for analysis. Detection limits for the target compounds in individual samples may be determined by multiplying the values in the Detection Limit column by the sample's dilution factor. Thus, for example, the detection limits for Sample 4A are 2.2 times the values in the Detection Limit column.

Methylene chloride found in almost all of the samples might represent contamination from the air in our laboratory. Soil samples were weighed on a balance in the lab, and they might have picked up contamination at that time. The lab blank contained only reagents and was not exposed to the air. If you wish, we could prepare a more representative blank by heating a soil to remove volatiles and then performing the analysis on that soil.

The initial amount of methylene chloride found in Sample 11, 32 µg/Kg, prompted us to analyze the sample a second time. The second analysis yielded a lower value, 6.1 µg/Kg, but it was performed two weeks beyond the holding time.

Please call if you have questions or wish us to perform additional analyses.

Dwight Easty

DWIGHT EASTY/jm

c: Earl Hanson - Richmond

Enclosures

Corporate Environmental Services-West
904 N.W. Drake Street, Camas, WA 98607-1999 (206) 834-4444

E 1. EPA 8260 VOLATILE ORGANIC ANALYSES

Source: Berlin
Job No.: 940411
Sample: Soil Samples, 8-16-94

COMPOUND	Detection Limit*	Lab Blank	Concentration, ug/Kg (Dry Weight) 1C	2A
Dilution factor		*1*	*2.16*	*0.96*
Percent Solids			*88*	*90*
Dichlorodifluoromethane	20	ND	ND	ND
Chloromethane	20	ND	ND	ND
Vinyl chloride	20	ND	ND	ND
Bromomethane	20	ND	ND	ND
Chloroethane	20	ND	ND	ND
Trichlorofluoromethane	2	ND	ND	ND
1,1-Dichloroethene	1	ND	ND	ND
Methylene chloride	2	0.2b	ND	6.1a
trans-1,2-Dichloroethene	2	ND	ND	ND
1,1-Dichloroethane	1	ND	ND	ND
cis-1,2-Dichloroethene	2	ND	ND	ND
2,2-Dichloropropane	2	ND	ND	ND
Bromodichloromethane	2	ND	ND	ND
Chloroform	1	ND	ND	ND
1,1,1-Trichloroethane	2	ND	ND	ND
1,1-Dichloropropene	2	ND	ND	ND
Carbon tetrachloride	2	ND	ND	ND
1,2-Dichloroethane	2	ND	ND	ND
Benzene	1	ND	ND	ND
Trichloroethene	3	ND	ND	ND
1,2-Dichloropropane	7	ND	ND	ND
Dibromomethane	4	ND	ND	ND
trans-1,3-Dichloropropene	2	ND	ND	ND
Toluene	1	ND	ND	ND
cis-1,3-Dichloropropene	2	ND	ND	ND
1,1,2-Trichloroethane	3	ND	ND	ND
1,3-Dichloropropane	2	ND	ND	ND
Dibromochloromethane	3	ND	ND	ND
Tetrachloroethene	3	ND	ND	ND

TABLE 1. Continued

COMPOUND	Detection Limit*	Lab Blank	1C	2A
1,2-Dibromoethane	3	ND	ND	ND
Chlorobenzene	1	ND	ND	ND
1,1,1,2-Tetrachloroethane	3	ND	ND	ND
Ethylbenzene	1	ND	ND	ND
p-&m-Xylenes	2	ND	ND	ND
o-Xylene	1	ND	ND	ND
Styrene	1	ND	ND	ND
Bromoform	5	ND	ND	ND
Isopropylbenzene	1	ND	ND	ND
1,1,2,2-Tetrachloroethane	2	ND	ND	ND
1,2,3-Trichloropropane	3	ND	ND	ND
Bromobenzene	2	ND	ND	ND
Propylbenzene	1	ND	ND	ND
2-Chlorotoluene	1	ND	ND	ND
1,3,5-Trimethylbenzene	1	ND	ND	ND
4-Chlorotoluene	1	ND	ND	ND
tert-Butylbenzene	1	ND	ND	ND
1,2,4-Trimethylbenzene	1	ND	ND	ND
sec-Butylbenzene	1	ND	ND	ND
p-Isopropyltoluene	1	ND	ND	ND
1,3-Dichlorobenzene	1	ND	ND	ND
1,4-Dichlorobenzene	1	ND	ND	ND
n_Butylbenzene	1	ND	ND	ND
1,2-Dichlorobenzene	2	ND	ND	ND
1,2-Dibromo-3-chloropropane	60	ND	ND	ND
1,2,4-Trichlorobenzene	50	ND	ND	ND
Hexachlorobutadiene	7	ND	ND	ND
Naphthalene	>100	ND	ND	ND
1,2,3-Trichlorobenzene	>100	ND	ND	ND

*Estimated detection limit for 10g soil sample.
ND means not detected or less than the blank level.
a. Reported value is lower than the lowest calibration standard(12.5ug/Kg).
b. Reported value is lower than the lowest calibration std and the estimated detection limit.

Table 2

Analysis of Soil Samples: MTBE[a] and TPH[b]

Lab Reference 940411

Sample	Solids Content %	MTBE, ppm	TPH, µg/g (ppm) dry basis	
			As Gasoline	As Fuel Oil
1C	88	--	--	1100
2A	90	ND <0.1	ND <10	--

---

[a] Methyl tert-Butyl Ether
[b] Total Petroleum Hydrocarbons

Note: Spike recovery of 2.5 ppm MTBE in soil: 87%

Methods:

MTBE and TPH as Gasoline - Extraction with methanol; purge-and-trap GC/MS analysis
TPH as Fuel Oil - Extraction with dichloromethane; analysis by GC/FID
Volatile Organics - EPA Method 8260

Analysts:

R. R. Claeys
K. J. Haunreiter
V. G. Claxton

State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES
6 Hazen Drive, P.O. Box 95, Concord, NH 03302-0095
603-271-3503 FAX 603-271-2867
TDD Access: Relay NH 1-800-735-2964

October 21, 1994

Mr. Jeffrey O'Hearn
Environmental Project Engineer
James River Corporation
650 Main Street
Berlin, NH 03570-2489

RE: CONTAMINATED SOIL DISPOSAL

Dear Mr. O'Hearn:

The New Hampshire Department of Environmental Services has received your letter of October 12, 1994 requesting approval to dispose 5 yd^3 of petroleum contaminated soil at the Mt. Carberry landfill. Based on the analytical data submitted with your correspondence, your request is approved.

Please contact me at the Solid Waste Compliance Section, Waste Management Division at (603) 271-2925, if you have any questions.

Sincerely,

Carl F. Woodbury
Waste Management Specialist IV
Waste Management Compliance Bureau

RSR/CFW/neo/ohrmltr
cc: James River Corp. Berlin File/DB
Carl F. Woodbury, SWCS

AIR RESOURCES DIV.
64 No. Main Street
Caller Box 2033
Concord, N.H. 03302-2033
Tel. 603-271-1370
Fax 603-271-1381

WASTE MANAGEMENT DIV.
6 Hazen Drive
Concord, N.H. 03301
Tel. 603-271-2900
Fax 603-271-2456

WATER RESOURCES DIV.
64 No. Main Street
P.O. Box 2008
Concord, N.H. 03302-2008
Tel. 603-271-3406
Fax 603-271-6588

WATER SUPPLY & POLLUTION CONTROL DIV.
P.O. Box 95
Concord, N.H. 03302-0095
Tel. 603-271-3503
Fax 603-271-2181

State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES
6 Hazen Drive, P.O. Box 95, Concord, NH 03302-0095
603-271-3503 FAX 603-271-2867
TDD Access: Relay NH 1-800-735-2964

January 25, 1995

Jeffrey O'Hearn
James River Corporation
650 Main Street
Berlin, New Hampshire 03570-2489

RE: Berlin, James River Corporation, TANK CLOSURE REPORT, (UST #0-112765)

Dear Mr. O'Hearn,

The New Hampshire Department of Environmental Services (DES) has reviewed the Tank Closure Report for a 2,000 gallon kerosine, a 3,000 gallon diesel, a 3,000 gallon gasoline and a 1,000 gallon #2 heating oil tank formally located at the James River Corporation. We have the following comments:

1. Based upon the information provided, it appears that a discharge of petroleum that will ultimately seep into surface water or groundwater of the State has not occurred. Therefore, DES will not require additional investigation or remedial measures at this time.

2. The owner(s) of this facility must meet the goals of N.H. Admin. Rules Env-Ws 410 "Groundwater Protection Rules," that is, groundwater at the site must continue to meet drinking water quality standards.

3. DES reserves the right, under N.H. Admin. Rules Env-Ws 410 "Groundwater Protection Rules" and N.H. Admin. Rules Env-Ws 412 "Rules for Reporting and Remediation of Oil Discharges," to require additional hydrogeological investigations and/or remedial measures if further information indicating the need for such work is received.

If you have questions, contact me at the Water Supply & Pollution Control Division at (603) 271-3644.

Sincerely,

Thomas R. Beaulieu
Groundwater Protection Bureau

TRB/trb:97
cc: File

IR RESOURCES DIV.
64 No. Main Street
Caller Box 2033
Concord, N.H. 03302-2033
Tel. 603-271-1370
Fax 603-271-1381

WASTE MANAGEMENT DIV.
6 Hazen Drive
Concord, N.H. 03301
Tel. 603-271-2900
Fax 603-271-2456

WATER RESOURCES DIV.
64 No. Main Street
P.O. Box 2008
Concord, N.H. 03302-2008
Tel. 603-271-3406
Fax 603-271-6588

WATER SUPPLY & POLLUTION CONTROL DIV.
P.O. Box 95
Concord, N.H. 03302-0095
Tel. 603-271-3503
Fax 603-271-2181

JAMES RIVER CORPORATION
COMMUNICATION PAPERS/N.E. GROUP
650 Main St., Berlin, NH 03570-2489 (603) 752-4600

December 20, 1993

Mr. Spruce Wheelock
Groundwater Protection Bureau
N.H. Department of Environmental Services
6 Hazen Drive, P.O Box 95
Concord, NH 03302-0095

Dear Mr. Wheelock:

Enclosed please find a list of our current Underground petroleum storage tanks and their current status. This list also includes tanks which have been temporarily closed per Env-Ws 411.17 and those tanks which will be permanently closed per Env-Ws 411.18 in the Spring of 1994.

As you can also see from the table, Tank #17 was recently discovered on-site. It was originally believed to be in the basement of the Scale Shack but upon closer investigation was found to be buried outside the building. When this was discovered the tank was pumped out and replaced with two aboveground tanks in the basement of the Scale Shack. This UST will be removed in the Spring of 1994.

Once four of the tanks are removed in the Spring of 1994 we will only have one UST on-site. This tank is currently in compliance with all of the applicable state and federal regulations.

If you have any questions or comments about this information please contact me at (603) 342-2363.

Sincerely,

Jeffrey O'Hearn
Environmental Project Engineer

ust_status_1993:vwp_jdo

cc: R. Danforth

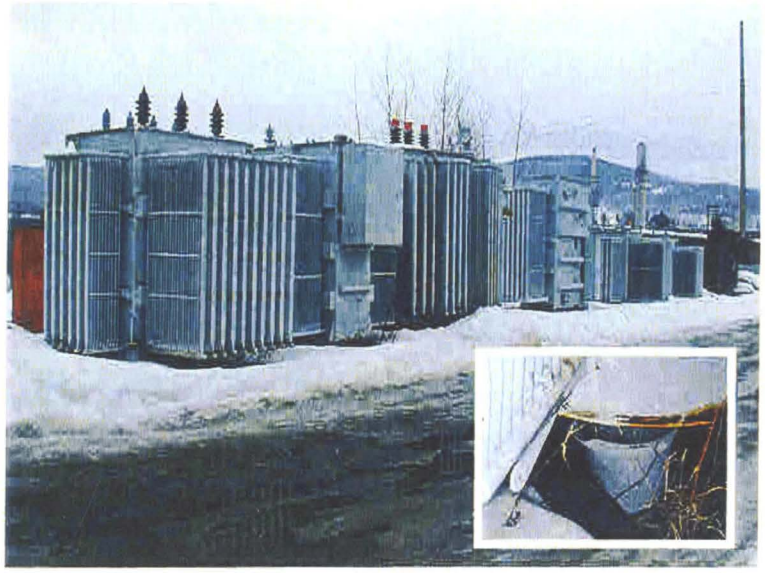
TANK #	LOCATION	CONTENTS	STATUS	TESTED	REMOVAL
1	CASCADE WWTP	#2 OIL	THIS TANK IS EQUIPPED WITH BOTH AN OVERFILL ALARM AND SPILL CONTAINMENT.	ANNUAL LEVEL TEST SUMMER 1993 TIGHTNESS TEST 7/14/88	1998
11	SAWMILL HYDRO	KEROSENE	THIS TANK IS EQUIPPED WITH SPILL PROTECTION. AT THIS TIME THE TANK CONTAINS PRODUCT WHICH WILL BE USED UNTIL THE TANK IS EMPTY. THIS TANK WILL NOT BE REFILLED AND IS SCHEDULED FOR REMOVAL IN THE SPRING OF 1994.	ANNUAL LEVEL TEST SUMMER 1993 TIGHTNESS TEST 8/15/89	SPRING 1994
14	TRACTOR SHOP	GASOLINE	THIS TANK IS EQUIPPED WITH SPILL PROTECTION. IT CURRENTLY MEETS THE REQUIREMENTS OF TEMPORARY CLOSURE AND IS SCHEDULED FOR REMOVAL IN THE SPRING OF 1994.	TIGHTNESS TEST DECEMBER 1992	SPRING 1994
15	TRACTOR SHOP	DIESEL	THIS TANK IS EQUIPPED WITH SPILL PROTECTION. IT CURRENTLY MEETS THE REQUIREMENTS OF TEMPORARY CLOSURE AND IS SCHEDULED FOR REMOVAL IN THE SPRING OF 1994.	TIGHTNESS TEST DECEMBER 1992	SPRING 1994
17	WOOD SCALE	#2 OIL	THIS TANK WAS RECENTLY DISCOVERED. IT WAS REMOVED FROM SERVICE WHEN IT WAS DISCOVERED AND IS CURRENTLY EMPTY. IT CURRENTLY MEETS THE REQUIREMENTS OF TEMPORARY CLOSURE AND IS SCHEDULED TO BE REMOVED IN THE SPRING OF 1994.	NOT TESTED	SPRING 1994

APPENDIX D

Site Photographs

REC #1: Example of oily staining observed on interior concrete floor slab. Photo shows staining under an air compressor, Maintenance Shop basement area. February 2002.

REC #2: Old vehicles, large equipment, and drums observed behind the Service Garage on unpaved ground. February 2002.



REC #3: Transformers stored near Maintenance Shop/Woods Department. Bucket (inset) with approximately one quart of oil observed underneath one transformer. February 2002.

REC # 4: Example of areas of solid waste observed in North Yard area. February 2002.

REC #5: Oil staining on outside of #6 oil tank that serves the Chemical Recovery Unit. February 2002.

REC #6: Accumulations of off-spec lime waste on cracked pavement surfaces on southern side of the Causticizing Plant. February 2002.

REC #8: Example of oil staining observed in several interior areas of the Service Garage. February 2002.

REC #8: Oil observed leaking from a transformer stored in the Service Garage "Hazardous Waste Vault". February 2002.

REC #9: Service Garage ASTs located on unpaved ground with no secondary containment. February 2002.

REC #11: Drum observed near northern property boundary fence. February 2002.

REC #12: Drum observed along railroad tracks, north of #6 fuel oil AST (west side of river). February 2002.

REC #13: Residual fuel oil observed on ground in fuel transfer area adjacent to the #6 fuel oil AST on west side of river. February 2002.

REC #14: Heavy staining observed on concrete slab and dirt floor of Railroad Repair Shop. February 2002.

REC #14: Railroad Repair Shop exterior solid waste. February 2002.

REC #20: Area of exposed fill observed north of Railroad Repair Shop. February 2002.

OSREC #1: Iron staining observed along river bank near Cell House area. February 2002.

APPENDIX E

Interview Documentation

RECORD OF COMMUNICATION						
Site Name: Burgess Mill			Location (city): Berlin, New Hampshire			
Communications with: Fred Mcgarry, P.E., NHDES – Waste Management Division						
Location: Concord, New Hampshire			Phone: (603)271-3503			
Communication via		Telephone		Letter	X	In Person
Recorded By: B. Smith			Of: H & A			
At: (time): 0800 - 0830			On (date): 19 February 2002			
Re: Primary NHDES concerns re: site						
Summary of Communication: Reviewed Cell House status, received draft sediment sampling results for mercury (by R.F. Weston, samples collected 2-4 December 2001). Fish tissue sampling results reportedly relatively low. Low levels (~AGQS) of mercury in discharge from Cell House area. Wastewater sludge from Burgess Plant not likely an issue for disposal due to large amounts of "clean" process water (18 – 20 mgd). Additional investigation at Cell House area likely required. Likely sludge went to Dummer or Mt. Carberry landfills. T-1 Transformer Area contains elevated PCBs in soil and groundwater. Request in from NHDES to EPA for NHDES to take enforcement lead, based on groundwater impacts. No. 6 fuel oil spills from rail transfers.						
Conclusions/Required Action/Follow-up: Consider during report development						

RECORD OF COMMUNICATION						
Site Name: Burgess Mill		Location (city): Berlin, New Hampshire				
Communications with: Peg Bastien, P.E., NHDES – Waste Management Division						
Location: Concord, New Hampshire		Phone: (603)271-3503				
Communication via		Telephone		Letter	X	In Person
Recorded By: B. Smith		Of: H & A				
At: (time): 0830 – 0910		On (date): 19 February 2002				
Re: Primary NHDES concerns re: site						
Summary of Communication: Peg is the NHDES project manager for the Cell House and T-1 transformer areas remediation. NHDES has not focused on the manufacturing area of the site. Mary Garren of EPA is working with Cascade on assessing environmental liabililites. PCBs present in soil and groundwater at the T-1 Transformer area. The R&D Building is being managed by Joyce Bledsoe, NHDES, under the Brownfields program. Additional Site Investigation is required at the Cell House site. A GMP application was received by NHDES for the Cell House, and the NHDES response is pending (additional bedrock investigation likely required). Tom White is the NHDES contact w/r/t the Burgess WWTP lagoons. Wendy Bonner is the NHDES contact w/r/t RCRA status. Fish and Game Department performed limited fish tissue analysis (2 samples) with "none detected" results.						
Conclusions/Required Action/Follow-up: Consider during report development. H&A contact Mary Garren of EPA						

G:\28701-970\Berlin\ROCs\ROC-PBastien-NHDES-20Feb02.doc

RECORD OF COMMUNICATION						
Site Name: Burgess Mill			Location (city): Berlin, New Hampshire			
Communications with: Bob Goodreau, Chief, Berlin Fire Department						
Location: Berlin, New Hampshire			Phone: 603.752.3135			
Communication via	X	Telephone		Letter		In Person
Recorded By: N. Keith			Of: H & A			
At: (time): 08:50			On (date): 19 February 2002			
Re: Environmental Records, Tank Registrations, and Spill Reports						
Summary of Communication: Mr. Goodreau indicated that the Fire Department's records were not public documents. He was unwilling to allow us to view them.						
Conclusions/Required Action/Follow-up: Called Sue Tremblay at City Assessor's Office – she indicated that she would set up a time for us to view documents.						

G:\28701-970\Berlin\ROCs\ROC-Goodreau-ngk-19Feb02.doc

RECORD OF COMMUNICATION						
Site Name: Burgess Mill			Location (city): Berlin, New Hampshire			
Communications with: Sue Tremblay, Assessor, City of Berlin						
Location: Berlin, New Hampshire			Phone: 603.752.7532			
Communication via	X	Telephone		Letter		In Person
Recorded By: N. Keith			Of: H & A			
At: (time): 09:15			On (date): 19 February 2002			
Re: City Environmental Records						
Summary of Communication: Mrs. Tremblay inquired at the Health Department on our behalf and was told that they do not maintain records on the Burgess Mill site related to environmental issues. She also indicated that she would contact the Fire Department regarding the availability of their records.						
Conclusions/Required Action/Follow-up: None						

G:\28701-970\Berlin\ROCs\ROC-Tremblay-ngk-19Feb02.doc

RECORD OF COMMUNICATION						
Site Name: Burgess Mill			Location (city): Berlin, New Hampshire			
Communications with: Tom White, NHDES – Water Division						
Location: Concord, New Hampshire			Phone: (603)271-3503			
Communication via	X	Telephone		Letter		In Person
Recorded By: B. Smith			Of: H & A			
At: (time): ~3:00 p.m.			On (date): 19 February 2002			
Re: Burgess Mill WWTF sludge disposal						
Summary of Communication: WWTF sludge disposed of at Mt. Carberry landfill. Sludge was disposed of at Dummer landfill in the past. Were some "issues" at Cascade WWTF prior to shutdown (summer 2001). Burgess WWTF working alright.						
Conclusions/Required Action/Follow-up: Consider during report development.						

G:\28701-970\Berlin\ROCs\ROC-TWhite-NHDES-19Feb02.doc

RECORD OF COMMUNICATION						
Site Name: Burgess Mill			Location (city): Berlin, New Hampshire			
Communications with: Lee Dube, Berlin Fire Department						
Location: Berlin, New Hampshire			Phone: 603.752.3135			
Communication via		Telephone		Letter	X	In Person
Recorded By: N. Keith			Of: H & A			
At: (time): ~9:00			On (date): 20 February 2002			
Re: Environmental Records, Tank Registrations, and Spill Reports						
Summary of Communication: Mr. Dube provided spill reports for the years 1990 through 2002. He indicated that the Fire Department did not have records of tank registrations for the site.						
Conclusions/Required Action/Follow-up: None						

G:\28701-970\Berlin\ROCs\ROC-Dube-ngk-20Feb02.doc

RECORD OF COMMUNICATION						
Site Name: Burgess Mill			Location (city): Berlin, New Hampshire			
Communications with: Roland Viens, Superintendent, Berlin Water Works						
Location: Berlin, New Hampshire			Phone: 603.752.1677			
Communication via		Telephone		Letter	X	In Person
Recorded By: N. Keith			Of: H & A			
At: (time): ~10:30			On (date): 20 February 2002			
Re: Drinking Water Protection Areas						
Summary of Communication: Mr. Viens indicated that the Burgess Mill was not located in or upgradient of a drinking water protection area. He provided maps showing the protected areas.						
Conclusions/Required Action/Follow-up: None						

G:\28701-970\Berlin\ROCs\ROC-Viens-ngk-20Feb02.doc

RECORD OF COMMUNICATION						
Site Name: Burgess Mill			Location (city): Berlin, New Hampshire			
Communications with: Mike Witten, St. Lawrence Northern Rail Road						
Location: Berlin, New Hampshire			Phone: (800)848-4408, x215 (Supervisor; Steve Kunsen)			
Communication via		Telephone		Letter	X	In Person
Recorded By: B. Smith			Of: H & A			
At: (time): ~11:30 a.m.			On (date): 20 February 2002			
Re: St, Lawrence/Northern maintenance shed operations						
Summary of Communication: Maintains rail cars (lubes, oils, cleans, welds). Waste oil stored in plastic or steel tanks and taken off site by Safety-Kleen. Safety-Kleen parts washer. Wash waster drains through cracks in floor near grease pit (location of waste oil, lube oil and caustic use and storage). Property leased from Pulp & Paper of America for past ~4 years. Burgess Mill fire protection inspectors visit ~weekly. Oil-soaked sorbant materials go to landfill for disposal.						
Conclusions/Required Action/Follow-up: Consider during report development.						

RECORD OF COMMUNICATION						
Site Name: Burgess Mill			Location (city): Berlin, New Hampshire			
Communications with: Frank Ramsey, PPA Safety Director (both Burgess and Cascade mills).						
Location: Berlin, New Hampshire			Phone: PPA			
Communication via		Telephone		Letter	X	In Person
Recorded By: B. Smith			Of: H & A			
At: (time):			On (date): 20 and 21 February 2002			
Re: Site conditions, Burgess Mill (tour guide for B. Smith and D. Allen)						
Summary of Communication: Mr. Ramsey escorted B. Smith and D. Allen during their two-day site visit. Mr. Ramsey identified process areas and equipment, and assisted the assessors with accessing interior and exterior areas of the site.						
Conclusions/Required Action/Follow-up: Consider during report development.						

RECORD OF COMMUNICATION						
Site Name: Burgess Mill		Location (city): Berlin, New Hampshire				
Communications with: Michael Perreault, Security Department						
Location: Berlin, New Hampshire		Phone: PPA				
Communication via		Telephone		Letter	X	In Person
Recorded By: J. Limbrunner		Of: H & A				
At: (time):		On (date): 20 and 21 February 2002				
Re: Site conditions, Burgess Mill (tour guide for T. Benedict and J. Limbrunner)						
Summary of Communication: Mr. Perreault escorted T. Benedict and J. Limbrunner during their two-day site visit. Mr. Perreault identified processes and equipment in areas including the Kraft Mill, Caustics, T-1 Transformer, Central Steam, and Riverside Mill. He assisted the assessors with accessing interior and exterior areas of the site.						
Conclusions/Required Action/Follow-up: None.						

RECORD OF COMMUNICATION						
Site Name: Burgess Mill			Location (city): Berlin, New Hampshire			
Communications with: Ray Danforth, former Crown Vantage environmental compliance manager (1980- 1999)						
Location: Berlin, New Hampshire			Phone: N/A			
Communication via		Telephone		Letter	X	In Person
Recorded By: B. Smith, D. Allen			Of: H & A			
At: (time): 0815 - 0910			On (date): 21 February 2002			
Re: General Site information						
Summary of Communication: Primary areas of environmental liability per M. Danforth included: landfill leachate to WWTF; long-term leaks in wastewater piping; asbestos and lead-paint abatement issues; miscellaneous spills (petroleum and black liquor); residual PCBs; coal ash fill beneath Burgess Mill main parking area. USTs were all closed in early 1980s in response to new UST regulations. Sediments dredged from Cross Dam circa 1990 not likely mercury-containing, due to intervening dams. Dredge spoil disposal location unknown. Much of the debris from demolished buildings likely remained on site. Oily gravel from petroleum spills to Dummer or Mt. Carberry landfills. All PCB wastes off site for incineration. Riverside Mill contained asbestos-based paper manufacturing process (late 1960s to mid-1970s). Mercury instruments, solvents for electrical motor cleaning used in building. Recently used for warehousing petroleum products. Wastewaters to river prior to connection to Burgess WWTF (1976). 1996 Sevee & Maher inventory of pipes going to river, initiated in response to local citizen's action, was reconciled by several followup studies. Citizen's action was dropped (per Tammy LaVoie, current environmental manager, in separate conversation this date and location).						
Conclusions/Required Action/Follow-up: This information was considered during development of the report.						

RECORD OF COMMUNICATION						
Site Name: Burgess Mill			Location (city): Berlin, New Hampshire			
Communications with: Don Mercier, PPA Power Systems Manager (high voltage power delivery to facility transformers, both Burgess and Cascade mills)						
Location: Berlin, New Hampshire			Phone: PPA			
Communication via		Telephone		Letter	X	In Person
Recorded By: B. Smith			Of: H & A			
At: (time): ~10:00 a.m.			On (date): 21 February 2002			
Re: Burgess Maintenance Building, transformers (general)						
Summary of Communication: Maintenance Building floor drains were installed for snow melt from trucks and piped to Berlin POTW with sanitary waste. High-power transformers all have containment per FERC and NHDES regulations. Periodic change-out / maintenance program for transformers. Not using PCE to leach PCBs from high-power transformers (contact Bob Chauvette at Burgess for additional information regarding power management from the low side of the high-power transformers Don is responsible for).						
Conclusions/Required Action/Follow-up: Consider during report development.						

G:\28701-970\Berlin\ROCs\ROC-DMercier-PowerSystems-21Feb02.doc

RECORD OF COMMUNICATION						
Site Name: Burgess Mill Service Garage			Location (city): Berlin, New Hampshire			
Communications with: Jerry Lavoi, Service Mechanic						
Location: Berlin, New Hampshire		Phone:				
Communication via		Telephone		Letter	X	In Person
Recorded By: T. Benedict		Of: H & A				
At: (time): 13:30		On (date): 21 February 2002				
Re: Service Garage Site Inspection						

Summary of Communication: Mr. Lavoi, Service Mechanic, was interviewed regarding operations at the Service Garage, located on Hutchins Street. Storage of virgin petroleum and hazardous substances on-site includes the following: (2) 300-gal. aboveground storage tanks (ASTs) for #2 heating fuel, (1) 275-gal. AST for kerosene for the pressure washer, (5) 275-gal. ASTs for various grades of lubricating oils, up to 10 drums for various grades of lubricating and hydraulic oils, (2) 200-gal. ASTs for hydraulic oils, and (2) Safety Kleen parts washer units (serviced every few weeks by an outside vendor). ASTs for gasoline (2,700-gal.) and diesel fuel (1,800-gal.) for vehicle refueling are located behind the Service Garage, to the east of the building on bare ground with no secondary containment (ground surface mostly covered by snow). Painted markings on the front of the building indicated the past use of up to three underground storage tanks (USTs) for gasoline, diesel fuel, and heating fuel. An area of cut and patched pavement was observed in the parking lot in front of the building. Mr. Lavoi reported that he believed that theUSTs had been removed from the cut and patched area approximately five years ago; no documentation was available to verify this.

Wastes stored at the site include the following: (1) 275-gal. AST for waste oil, (2) 200-gal. totes for waste oil (one tote leaking to garage floor), (3) drums for waste antifreeze, several lead-acid storage batteries stored on floor by the "Hazardous Waste Vault". Waste oil is reportedly sent down to the Burgess Mill plant to be burned on-site; antifreeze is shipped off-site for recycling. The "Hazardous Waste Vault", located in the northeast corner of the building, has walls on three sides, a concrete floor, and is accessed by a gated chain-link fence that was locked at the time of the site inspection. The "vault" is reportedly used as the central, <90-day hazardous waste storage area for the entire Burgess Mill site. While the inside of the "vault" was not accessible for close inspection, it was found to contain three large transformers bearing "PCB" labels, two small (<5 gallon) containers bearing "hazardous waste" labels, one drum bearing a "PCB" label, and approximately (30) unlabeled drums and overpack containers (site contacts could not verify whether these containers were empty or full). Hazardous wastes are reportedly shipped off-site for treatment/disposal. The "vault" was formerly used as a large paint booth until converted to the present use. Mr. Lavoi indicated that painting operations are currently done in the vehicle service bays with the doors open for ventilation, or painting is done outside in the rear parking lot. Mr. Lavoi indicted that paint guns are cleaned with lacquer thinner that is reused until spent; spent lacquer thinner is then soaked into Speedy Dry and then sent for disposal at the Mt. Carberry landfill. (continued)

Summary of Communication with Jerry Lavoi (continued):

Wastewater from pressure washing of vehicles, parts, and equipment is generated at the indoor wash bay located along the western side of the building. The wash water discharges to grated floor trenches in the Wash Bay that drain to a sump that is tied into the building floor drainage system. The sump apparently functions only as a grit settling chamber, and there is reportedly no oil/water separator that serves the Service Garage. Mr. Lavoi indicated that settled grit and sludge from the sump is periodically scooped out with a backhoe and disposed of at the Mt. Carberry landfill. Wastewaters from the Wash Bay and several floor drains in the Service Garage reportedly drain to the sanitary sewerage system that discharges to the Burgess Mill wastewater treatment plant (WWTP). Prior to the tie-in to the Burgess Mill WWTP in the early 1970's when that plant was constructed, wastewaters from the Service Garage reportedly discharged to the municipal sanitary sewerage system. The Service Garage is believed to have been constructed in the 1940's.

Several areas of heavily oil-stained floors were observed in the Service Garage, including the vehicle service pit, the area around the virgin lube oil tanks, and the area around a leaking waste oil storage tote. Mr. Lavoi indicated that oil-soaked Speedy Dry from routine floor sweeping and spills is typically disposed of at the Mt. Carberry landfill.

Behind the Service Garage, to the east of the building, approximately 20 vehicles were stored or parked, several tanks and pieces of large unused equipment (likely associated with wastewater treatment systems), and approximately 20 drums were observed. Many of the drums were frozen in-place and partially buried in snow; a few of the drums were full or partially full, as determined by tapping on the drums.

RECORD OF COMMUNICATION						
Site Name: Burgess Mill			Location (city): Berlin, New Hampshire			
Communications with: Heather Carpenter, Records Department, New Hampshire						
Department of Environmental Services						
Location: Berlin, New Hampshire			Phone: 603.271.8808			
Communication via	X	Telephone		Letter		In Person
Recorded By: N. Keith			Of: H & A			
At: (time): 14:00			On (date): 22 February 2002			
Re: UST Registrations/Closure Reports						
Summary of Communication: Mrs. Carpenter checked the NHDES's records and indicated that they had no records relating to USTs for the site. She said that NHDES started keeping records in the 1980s and that their records are incomplete prior to the mid-80s.						
Conclusions/Required Action/Follow-up: None						

G:\28701-970\Berlin\ROCs\ROC-Carpenter-ngk-22Feb02.doc

RECORD OF COMMUNICATION						
Site Name: Burgess and Cascade Mills, PPA			Location (city): Berlin & Gorham, New Hampshire			
Communications with: Tammie Lavoie, Manager of Environmental Services, PPA						
Location: Berlin, New Hampshire			Phone: 603-342-2361			
Communication via		Telephone		Letter	X	In Person
Recorded By: D.C. Allen			Of: H & A			
At: (time): Approx. 8:30 to 13:30			On (date): 27 February 2002			
Re: Site info and walkover						
Summary of Communication: Tammie provided site access for follow-up walk-overs of the Burgess (Berlin) and Cascade Flats (Gorham) Mills. Tammie provided access to several areas previously locked at both locations. At the Gorham Mill, site access was also provided by Mr. Al Reynolds of PPA. Tammie also provided additional information regarding North Yard (Burgess) PCBs sampling and documentation regarding UST removals.						
Conclusions/Required Action/Follow-up: None						

APPENDIX F

Preliminary Asbestos Survey

- Draft -

March 4, 2002

Mr. Jim Griswold
Senior Hydrogeologist
Haley and Aldrich, Inc.
340 Granite Street, Third Floor
Manchester, New Hampshire 03102-4004

RE: Preliminary Site Visit – Asbestos Containing Materials Draft
Pulp & Paper of America Facility
Berlin, New Hampshire

DRAFT

Dear Mr. Griswold;

In accordance with our recent communications RPF Associates Inc. (RPF) completed a preliminary site visit at the Pulp & Paper of America LLC (PPA) property located in Berlin, New Hampshire. The site visit was completed by Dennis N. Francoeur Jr., CIH CSP on February 27, 2002. The purpose of the site visit was to visually review the condition of presumed asbestos containing materials (PACM) and asbestos containing materials (ACM) located within the Riverside Mill, Central Steam Plant and the Kraft Mill–Old Boiler area and provide this letter of preliminary findings including initial preliminary cost estimates for cleaning of the areas. While on-site, RPF was also asked to review an exposed dirt banking near the Railroad Shop located northwest of the A Frame. Limitations of this preliminary survey are discussed herein and are also provided in Attachment A. RPF was also provided a copy of documentation entitled Burgess Pulp Mill Asbestos Locations & Amounts (PPA Inventory, provided as Attachment B) for preliminary review

Observations and Findings

After an initial site meeting with Douglas Allen, James Limbrunner of Haley and Aldrich and Tammie Lavoie of PPA, RPF started the site visit with Mr. Francis Ramsey, Safety Director for the site for PPA. From our discussions with Mr. Ramsey, the PPA facility has three employees trained and licensed to remove ACM and PPA routinely completes small-scale removal projects. PPA was listed by the State of New Hampshire as a licensed asbestos abatement contractor No. C-7 with an expiration date of January 24, 2001. An ACM labeling program is also reported to be in place including the labeling of non-ACM replacement thermal system insulation (TSI) materials as non-ACM when abatement activities are completed. RPF was also provided a copy of a summary of ACM inventory (PPA Inventory) at the facility, which indicates that 98 percent of the mill, had been surveyed as of January 22, 2001. Estimated quantities of ACM listed in the Inventory were not measured or confirmed during this preliminary site visit. Each of the areas will be described separately below.

River Side Mill

The River Side Mill is a wooden structure, which previously housed paper machines and is now used for storage. Accessible floors and walls were wooden with several areas of floor covered with metal sheeting. Limited accessible ACM was observed as we walked the length of the building, south to north, to access the ladder to the basement area. The basement area has a limited concrete walkway along the west side of the building and a combination of dirt, stone, concrete and wooden pathways for most of the basement. Ceiling height and access to pipes is varied and limited in some locations. Many of the pipes in the area are void of insulation. A main steam line does runs most of the length of the basement and the insulation is in varying states of repair. Several smaller lines are also insulated in the area. Portions of the ACM insulation have been removed, replaced with non-ACM insulation in some places and other sections wrapped in poly sheeting. Danger caution tape is up at many locations with asbestos warning signs also present. In some areas the caution tape has fallen to the ground. The pipe insulation could be classified as damaged to significantly damaged in localized areas.

The extent of soil contamination could not be determined visually but is anticipated to be present based on the conditions observed. Initial estimates indicate that an area of approximately 15' by 180' would need to be evaluated and sampled to determine the presence or absence of ACM contamination in the soil in the basement. Suspect materials were observed in several areas however with the presence of old dried paper pulp, we were not able to determine what materials on the floor may be ACM or just dried paper pulp. Employee access in this area is reported to be limited to security personnel accessing two fire control–valve rooms. Replacement non-ACM insulation was observed stored in one area. RPF was not able to determine if representative employee exposure determinations had been completed for employees who may work in this basement area.

The PPA Inventory lists approximately 170 linear feet of insulation on the 140# steam line and approximately 315 feet of other thermal system insulation (TSI) in the basement area. Some of this material may have been removed since the printing of the Inventory. The Inventory also lists approximately 850 square feet of 9" x 9" green floor tile as containing chrysotile asbestos, 300 square feet of transite ceiling panels and 150 square feet of transite wall panels on the roof. The flooring and transite were not observed during our site visit.

Central Steam Plant

The ACM within the Central Steam Plant is in varying conditions. Accessible ACM along main travel areas and passageways was in good condition with limited damage. Areas with evidence of minimal employee access varied from

good to damaged condition, with significantly damaged materials observed associated with the older boiler systems that are no longer in service. Our limited site visit indicates that there are three older no longer functioning coal boilers in various stages of dismantling, Boilers Nos. 3, 4, and 5. Suspect ACM was observed associated with these three boilers and associated upper levels had been covered by poly sheeting in some areas to control the release of fibers. Boilers 7 and 14 were also reported to be non-operational. Boilers No. 12 and 9 were operational. Much of No. 9 was covered with new insulation and metal coverings and was in good condition overall. No. 12 was also in good condition overall. Pipe insulation was also observed throughout the building with much of it labeled as either ACM or non-ACM. In general, the ACM was in good condition with localized damage in several locations. Labeling of PACM and ACM was not sufficiently thorough as to what was or what was not ACM. Additionally, limited housekeeping in some areas made it difficult to determine whether debris was ACM. Additional sampling of materials will be required for confirmation.

The PPA Inventory lists approximately 3,000 linear feet of pipe insulation, 3,500 square feet of block and decking insulation, 20,000 square feet of siding as ACM for this building. The estimates for boiler insulation (block) may be an underestimate and may not include the interiors of the boilers and associated breechings. Additional testing will be needed when the boilers are off and the outer metal layers can be accessed. The Inventory also lists approximately 560 square feet of 12" x 12" light green/olive floor tile as chrysotile asbestos and 700 square feet of transite asbestos. Unknown quantities were also listed associated with the line 7 & 8 boiler drum and the mortar within boilers No. 3, 4, and 5.

Kraft Mill – Old Boiler – No. 8 Recovery Boiler

The Recovery Boiler is reported to have been out of service for approximately nine years. Signs on each floor warn employees that the area contains ACM and that precautions should be taken before working on the boiler and associated piping. Many sections of the boiler have been damaged with exposed friable suspect ACM. The boiler is approximately eight stories tall and 25' x 30' plus associated piping. Approximately 50% of the piping is labeled as non-ACM. Four evaporators-tanks labeled as ACM were also present with a diameter of approximately ten feet and height of four stories. Sections of insulation had been replaced with non-ACM. Labeling of PACM and ACM was not always sufficient to what was or what was not ACM. Additionally, limited housekeeping in some areas made it difficult to determine whether debris was ACM. Much of the boiler is still encased with metal siding making access to suspect ACM difficult.

The PPA Inventory lists approximately 5,800 square feet of boiler cavity decking as ACM and 700 square feet of ceiling material. The large evaporators were not included in the inventory and four of the six were labeled as ACM. Additional sampling of materials will be required for confirmation.

Exterior Dirt Banking

An exposed dirt banking was observed adjacent to the railroad shop. Approximately 50 feet of soil bank, one to three feet in height was observed not covered with snow, near various lumber and rail ties. An area of approximately ten feet long had visible suspect ACM in the form of cement board, gasket material, and loose damaged thermal system insulation. A sample of the cement board was reported as 30% chrysotile and a sample of the loose TSI was reported as 10% chrysotile insulation. Additional investigation and sampling will be required to determine the extent and quantity of material present after the snow cover has melted.

The PPA Inventory provided to RPF appears to be a summary of known ACM at the PPA facilities. It lists identified ACM in the form of thermal system insulation, decking, siding, roofing, tanks, ducts boilers and floor tiles. In some instances mud, mortar and mastic materials are mentioned. Actual inspection reports including names and training of inspectors, laboratory certifications, limitations and actual laboratory results were not reviews as part of this preliminary visit. The inventory does not list those materials sampled and determined to not contain asbestos. Other suspect materials, which will require further review and possible sampling by an accredited inspector prior to renovation or demolition activities include but are not limited to the following:

- Construction adhesives, mastics and flashings;
- Floor tile mastics and/or multi-layered systems (expansion papers);
- Window putties and caulks;
- Door and foundation caulks;
- Ceiling tiles;
- Wall boards and joint compounds;
- Ceiling and wall plasters and coatings (sprayed, brushed or troweled on);
- Sprayed on fireproofing
- Transite pipes;
- Laboratory hoods, cabinets and countertops;
- Pipe and valve gaskets;
- Internal insulation of mechanical systems and boilers;
- Electrical insulation; and
- Debris located adjacent to damaged or previously repaired ACM

It is RPF's understanding that PPA was conducting ACM abatement with its own employees and subcontract employees. Extensive analytical data and exposure monitoring data is presumably on file and may provide additional information on the extent of past ACM activities. RPF also understands that PPA operates a permitted landfill of the disposal of ACM. The status of the landfill had not been confirmed as part of this preliminary review.

Preliminary Cost Estimates for Asbestos Abatement

RPF's opinions on the estimated costs for abatement are presented below. Actual final cost will be dependant on a variety of factors. A site-specific work plan, or technical specifications must be developed by an accredited Project Designer and followed to ensure that the regulatory requirements from the State of New Hampshire, US DOL OSHA and US EPA are followed. As part of the development of the site plan for abatement, further survey, review and testing of PACM will be required to more fully delineate the extent of ACM and contamination. Travel expenses must also be considered with contractors due to the location of the facilities. Consideration of impact on costs with the utilization contractors (union or non-union) or licensed employees from the plants should be made when developing the site-specific work plan. Significant short term cost savings may also be available with the use of the permitted PPA landfill. Unit rates are difficult to establish not knowing the size of the projects to be completed, spot removals or full scale abatement of large sections or quantities of ACM. Attachment A includes a summary of ACM remaining at the facilities, which may require abatement in the future.

As an example TSI pipe insulation removal costs based on complexity of the removal and diameter of pipes can range from $10.00 to $25.00 per linear foot for interior removal and $20.00 to $75.00 per linear foot for exterior removal of pipe insulation. Cost analysis must include considerations for contractor materials, mechanical equipment, technical survey and specification design, industrial hygiene air monitoring and independent (from the removal firm) final industrial hygiene inspection and clearance air testing.

Each of the areas RPF was requested to review will be discussed below utilizing quantity estimates provided in the Inventory provided by PPA.

River Side Mill

The River Side mill contains approximately 485 linear feet of ACM pipe insulation in the basement area. With an estimated cost range of $10.00 to $25.00 per linear foot, the estimate may range from $4,850. to $12,125. excluding the additional cost pre-cleaning of contaminated soils in the area. Determining the extent of the cleaning will require additional investigation and analytical data.

Abatement of the estimated 850 square feet of ACM floor tiles with a range of $2.50 to $5.00 per square foot will range from $2,125. to $4,250. Information on the substrate which the flooring is attached to, whether the mastic is to be removed as ACM and the number of layers of floor tile would need to be determined prior to obtaining an actual cost.

Abatement of the estimated 450 square feet of transite sheeting may range from $4.50 to $6.00 per square foot excluding consideration of access, space limitations, and fastening systems.

Kraft Mill – Old Boiler – No. 8 Recovery Boiler

Based on the very limited information available at the time of the site visit, estimated costs for the demolition of and removal of the ACM from the No. 8 Recovery Boiler could range from $100,000. to $300,000. This includes the approximate values for scrap metals reclamation recovered by the contractor during demolition. However, it is essential that additional investigation, engineering and project design be completed due to the need to demolish the boiler structure as part of the abatement. It should be noted that that if employee access to this area of the facility can be limited to essential personnel only with proper ACM training that the ACM would not need to be removed at this time. ACM removal is not mandatory until such time that a structure is to be renovated or demolished, however the ACM must be maintained in a manner to prevent employee exposure to airborne asbestos fibers.

Central Steam Plant

Based on the limited information available at the time of the site visit, estimated costs for the removal of the ACM from the various boilers and piping systems could range from $75,000. to $250,000. per boiler unit. This includes approximate values for scrap metals reclamation recovered by the contractor during demolition. However, it is essential that additional investigation, engineering and project design be completed due to the need to demolish the boiler(s) structure in an active operating steam plant as part of the abatement. Costs associated with this work will be impacted by which portions of the remainder of the Central Steam Plant will be occupied and operational during removal and demolition activities. ACM removal is not mandatory until such time that a structure is to be renovated or demolished, however the ACM must be maintained in a manner to prevent employee exposure to airborne asbestos fibers.

This letter of findings and our opinions of cost estimates for remedial action derived from this preliminary site visit are subject to the attached limitations. Please contact RPF if you have any questions or require additional information or assistance with this important project.

Sincerely
RPF Associates, Inc.

Dennis N. Francoeur Jr., CIH CSP
Principal

Attachments: Attachment A Limitations
Attachment B Summary of ACM Crown Vantage Burgess and Cascade Plants 1/22/01

ATTACHMENT A

PRELIMINARY SURVEY LIMITATIONS

1. The observations and conclusions presented in the Preliminary Letter of Findings were based solely upon the services described herein, and not on scientific tasks or procedures beyond the scope of services as discussed in the proposal and text of the report.

   The inspection was limited and included only visual inspections of designated accessible suspect materials and a preliminary, limited review of the PPA Inventory. Initial or supplemental inspections, bulk material testing, and analysis to identify asbestos-containing material (ACM) was not performed during this preliminary survey except as otherwise noted for the spot sampling of the accessible exterior debris on the banking adjacent to the railroad shop.

2. RPF has relied upon the data provided to the extent indicated and has not conducted an independent evaluation of the reliability of the PPA Inventory data. Based on our preliminary visual observations, it appears that other suspect ACM are present that are not addressed in the PPA Inventory. These other suspect ACM will require inspection, testing and documentation in accordance with the most current State and federal regulations prior to any renovation and demolition activity in the affected areas. Based on the results of such further survey work, the preliminary cost estimates for abatement and surface cleaning could be significantly impacted.

3. Observations were made of the designated areas of the site as indicated in the Preliminary Letter of Findings. While it was the intent of RPF to conduct a survey to the degree indicated, it is important to note that not all ACM in the designated areas were specifically assessed and visibility was limited, as indicated, due to the presence of solid walls and ceilings and mechanical systems such as the large boiler units throughout the facility. Asbestos may have been used and may be present in areas where detection and assessment is difficult or not possible until spot demolition is performed allowing access to such remote areas. Where access to portions of the surveyed area was unavailable or limited, RPF renders no opinion of the condition, assessment, and potential impact on remediation cost estimates.

4. Existing reports, drawings, and analytical results provided by the Client to RPF, as applicable, were not verified and, as such, RPF has relied upon the data provided as indicated, and has not conducted an independent evaluation of the reliability of these data. Prior to construction (during project design investigation) further testing and survey work, as well as more detailed reviews of the existing records should be performed by qualified, licensed firms.

DOCUMENT 7

FRASER PHASE II HYDROGEOLOGICAL INVESTIGATION REPORT (GZA) 2003

PHASE II
HYDROGEOLOGIC INVESTIGATION
BURGESS PULP MILL AND
CASCADE PAPER MILL
BERLIN AND GORHAM, NEW HAMPSHIRE

PREPARED FOR:
New Hampshire Department of Environmental Services
Concord, New Hampshire

PREPARED BY:
GZA GeoEnvironmental, Inc.
Manchester, New Hampshire

December 2003
File No. 23441

GZA
GeoEnvironmental, Inc.

Engineers and Scientists

December 31, 2003
File No. 23441

Ms. Peg Bastien
Hazardous Waste Remediation Bureau
New Hampshire Department of Environmental Services
29 Hazen Drive, P.O. Box 95
Concord, New Hampshire 03302-0095

380 Harvey Road
Manchester
New Hampshire
03103-3347
603-623-3600
FAX 603-624-9463
http://www.gza.net

Re: Phase II Hydrogeologic Investigation Report
Burgess Pulp Mill and Cascade Paper Mill
Berlin and Gorham, New Hampshire

Dear Ms. Bastien:

GZA GeoEnvironmental Inc. (GZA) is pleased to submit to the New Hampshire Department of Environmental Services (NHDES) the attached report entitled "Phase II Hydrogeologic Investigation Report, Burgess Pulp Mill and Cascade Paper Mill, Berlin and Gorham, New Hampshire," dated December 31, 2003. The report provides a summary of the work conducted in accordance with GZA's Work Plan dated August 28, 2002, and with our *Contract to Conduct Site Investigation and Remediation Work at Contaminated Sites in New Hampshire for the NHDES* effective July 15, 1998 and subsequent addenda.

The approach for the study was to collect subsurface environmental data at general downgradient locations and at potential historical environmental issue areas to provide an initial level of hydrogeologic investigations. The approach provided for relatively broad data collection across the large site areas that have extensive histories of industrial usage and chemical handling practices. We have provided recommendations to address data gaps as well as specific conditions encountered. The attached report includes a Geographic Information System (GIS) for presentation of certain data that was collected during the study. The GIS system provides an interactive tool for viewing the environmental data. Further, the GIS system can be updated in the future to include new data collected during subsequent studies.

We appreciate the opportunity to provide the NHDES with environmental consulting services. We look forward to discussing the results of this study with you and reviewing the GIS system.

Please contact us if you have any questions or comments.

Very truly yours,

GZA GEOENVIRONMENTAL INC.

Donald N. Kirkland
Engineer I

James M. Wieck, P.G.
Senior Project Manager

Steven R. Lamb, P.G., C.G.W.P.
Principal

STATE OF NEW HAMPSHIRE
STEVEN
R.
LAMB
No. 082
LICENSED
PROFESSIONAL GEOLOGIST

JMW/SRL:tmd
i:\jobs\23441\cvrltr.doc

Attachment

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

TABLES

FIGURES

APPENDICES

1.0 INTRODUCTION

GZA GeoEnvironmental, Inc. (GZA) is pleased to present to the New Hampshire Department of Environmental Services (NHDES) this report summarizing the methods and results of the Phase II Hydrogeologic Investigation of the Burgess Pulp Mill (Burgess Mill) located in Berlin, New Hampshire and the Cascade Paper Mill (Cascade Mill) located in Gorham, New Hampshire. The mill facilities are currently owned and operated by Nexfor Fraser Papers, Inc. (Nexfor). The locations of the sites are shown on **Figure 1**. The results of the hydrogeologic investigation downgradient of the Dummer Landfill located in Berlin, New Hampshire are summarized under separate cover.

This work was completed in accordance with GZA's Work Plan dated August 28, 2002 and our *Contract to Conduct Site Investigation and Remediation Work at Contaminated Sites* in New Hampshire for the NHDES, effective July 15, 1998 and subsequent addenda. The purpose of GZA's work was to render an opinion of the presence of hazardous materials within the soil and shallow groundwater in the aforementioned areas. The scope of services for the investigation included:

- Reviewing background information and preparing base maps;
- Performing subsurface explorations;
- Testing hydraulic conductivity of subsurface soils;
- Monitoring of groundwater quality;
- Conducting a level elevation survey;
- Evaluating data collected during the exploration program; and
- Preparing this technical summary report.

The contents of this report are subject to the Limitations provided in **Appendix A.**

In addition to this report, GZA is pleased to provide a Geographic Information System (GIS) database of the Burgess and Cascade Mills. This database can be utilized as an interactive tool to show the boring logs and soil / groundwater data at all monitoring locations with the ability for future data additions. GIS-based figures summarizing environmental concerns, bedrock elevation contours, and groundwater elevation contours are included in this report (refer to **Appendix F**).

In general, the work summarized herein identified limited environmental issues in consideration of the size of the site properties, industrial usage, and long history of use. This report summarizes information regarding ten areas that were identified as concerns located throughout the two sites. At the Burgess Mill, these areas include the railroad repair shop, the No. 6 bulk fuel oil storage, the 500,000-gallon aboveground storage tank (AST), chlorinated solvent contamination area, the former Bermico Pipe Mill, and the Weak Liquor Storage Area. Areas of concern at the Cascade Mill included the pump house and wastewater lift station, the railcar ASTs, and the diesel AST in the former truck repair shop.

2.0 BACKGROUND

A Site Locus illustrating the locations of each mill is included on **Figure 1**. Site plans for the Burgess Mill and Cascade Mill are included on **Figure 2** and **Figure 3**, respectively.

GZA's understanding of site conditions is based on our observations and conversations during our initial July 19, 2002 site visit, historical research conducted during 2003, field operations conducted between October 13, 2003 to November 14, 2003, and information summarized in the following reports:

- Report by Haley & Aldrich, Inc. (H&A) titled "Report On, ASTM Phase I Environmental Site Assessment, Pulp And Paper Of America Burgess Mill, Berlin, New Hampshire," dated March 4, 2002;
- Report by H&A titled "Report On, ASTM Phase I Environmental Site Assessment, Pulp and Paper of America Cascade Mill, Gorham, New Hampshire," dated March 5, 2002; and
- Report by Tighe & Bond titled "T-1 Transformer, Pulp & Paper of America, Burgess Pulp Mill, Berlin, New Hampshire," dated March 2002.

The following sections provide a brief description of the sites and GZA's understanding of areas of environmental concern associated with each of the sites.

2.1 BURGESS MILL

2.1.1 Site Description

The Burgess Mill site includes about 170 acres in Berlin, New Hampshire located along both sides of the Androscoggin River. The site is roughly bordered to the west by Main Street, to the north by the Northern Forest Heritage Park, to the East by Hutchins Street, and to the south by Community and Hutchins Streets. Site boundaries are shown on **Figure 2**. The immediate site vicinity includes relatively dense residential usage to the south, northeast and west; the Dummer Landfill to the east; and a recreational park to the south. **Figure 2** is the Site Plan for the Burgess Mill site and shows pertinent features.

This site has been used for industrial purposes since 1852. Historical industrial activity at the site has included a sawmill, and pulp/papermaking and supporting facilities. Industrial activity has included production of wood pulp for papermaking through the utilization of the sulfite and Kraft processes. The latter process began operations in 1910. The sulfite process was discontinued during the 1960s. Pulping of wood is achieved through the addition of chemicals that liberate cellulose fibers within wood by destroying the chemical bonds of the lignin that hold the fiber together. Sulfite pulping destroys the lignin bonds through the addition of sulfurous acid (H_2SO_3) and biosulfite ion (HSO_3^-). The Kraft process achieves the same outcome through the use of "white liquor" consisting of sodium sulfide (Na_2S) and sodium hydroxide (NaOH) in a 10% solution.[1] The outputs from this process are the extracted pulp and "black liquor" that contains lignin solids in a solution of pulping chemicals. A chemical recovery process is employed in order to re-use many of the process chemicals. A by-product of the recovery process is "Green

[1] http://www.csa.com/routenet/epan/pulppasnIIIa.html

Liquor" which is primarily sodium carbonate ($NaCO_3$) and Na_2S. Following the pulp extraction process, the pulp is bleached with chlorine dioxide. The final pulp material is piped to the Cascade Mill for the paper production process.

2.1.2 Topography and Drainage

Based on field observations and review of United States Geological Survey (USGS) Topography Quadrangle Map for Berlin, New Hampshire, topography of the Burgess Mill generally slopes toward the Androscoggin River from both the east and west. The topographic high point is situated by the scale house directly east of monitoring location GZ-4 (elevation approximately 1110 feet). The topographic low point is located along Community Street in the general vicinity of monitoring wells GZ-2 and GZ-3 (elevation approximately 1038 feet). The locations of monitoring wells installed by GZA during this study are shown on **Figure 2**.

Storm water runoff would be expected to flow in a westerly direction toward the Androscoggin River in paved areas. Storm drains throughout the facility reportedly outlet to the river. Undeveloped, grassy or wooded portions of the site would also be expected to direct storm water runoff toward the Androscoggin River, but a percentage of the runoff is expected to infiltrate into the ground surface.

2.1.3 Areas of Environmental Concern

- Incidental spillage and leakage of chemicals used in the production of wood pulp including:
  - Fuel oils,
  - Lubricating oils,
  - Hydraulic oils,
  - Gasoline, and
  - Chemicals related to wood pulping and pulp bleaching [sulfuric acid (H_2SO_4), phosphoric acid (H_3PO_4), NaOH; Na_2S; calcium hydroxide ($Ca(OH)_2$); Na_2CO_3, calcium oxide (CaO), hydrogen peroxide (H_2O_2), chlorine dioxide (ClO_2)], and certain potential process byproducts (dioxins);
- Incidental spillage of oils and solvents used in the maintenance and repair of process equipment;
- Groundwater quality and incidental spillage associated with the operation of the wastewater treatment facility;
- Releases of No. 6 fuel oil summarized in the above-referenced report by H&A; and
- On-site disposal of building debris and ash.

2.2 CASCADE MILL

2.2.1 Site Description

The Cascade Mill site includes about 52 acres in Gorham, New Hampshire located along the western side of the Androscoggin River. The site is bordered to the west by Route 16 and the St. Lawrence & Atlantic Railroad, to the north and east by the Androscoggin River, and to the

south by residentially and commercially zoned areas. The immediate site vicinity includes residential zoning to the west across Route 16 and undeveloped woodland to the east across the river. **Figure 3** is the Site Plan for the Cascade Mill site and provides information on site features.

This site has been used for industrial purposes since 1903. Papermaking is the only known industrial activity to have occurred at the site. The pulp prepared at the Burgess Mill is piped underground to the Cascade Mill where it is used in the papermaking process. Currently, additives such as dyes, brighteners, resins, and biocides are used throughout the papermaking process. The mill has processed many types of paper products over the years and currently prepares specialty paper, such as stationery.

GZA

2.2.2 Topography and Drainage

Based on field observations and review of USGS Topography Quadrangle Map for Berlin, New Hampshire, topography of the Cascade Mill generally slopes to the East toward the Androscoggin River. Topographic high points are located near the St. Lawrence & Atlantic Railroad directly west of monitoring location GZ-28. Topographic low points exist along the eastern boundary of the site adjacent to monitoring locations GZ-30 and GZ-31. The locations of monitoring wells installed by GZA during this study are shown on **Figure 3**.

Storm water runoff would be expected to flow in a westerly direction from the uppermost portions of the site and discharge to the river. There is one storm drain at the site with catch basins throughout the site. This storm drain reportedly discharges to the river.

2.2.3 Areas of Environmental Concern

- Incidental spillage and leakage of chemicals used in the production of paper including:
  - Fuel oils,
  - Lubricating oils,
  - Hydraulic oils,
  - Gasoline, and
  - Paper additives;
- Incidental spillage of oils and solvents used in the maintenance and repair of process equipment;
- Groundwater quality and incidental spillage associated with the operation of the wastewater treatment facility; and
- Releases of No. 6 fuel oil discussed in the above-referenced report by H&A.

3.0 REVIEW OF HISTORICAL AND REGULATORY INFORMATION

3.1 INTRODUCTION

The objectives of the review of the historical and regulatory information was to collect and evaluate available historical information on site usage and chemical history leading to the development of a general understanding of potential site subsurface environmental issues.

Information was organized and documented, and was used to develop strategies for subsurface exploration and environmental sampling.

GZA's work included a review of available information from a variety of sources. Specifically, the historical data gathering was directed to identifying information regarding site history, chemical usage and storage, and chemical spills that may have occurred. The following is a list of the sources of information that was reviewed by GZA for this study:

- Fraser Paper, Inc. (Fraser);
- Waste Management Division (WMD) of the NHDES;
- Northern Forest Heritage Park;
- City of Berlin City Hall (including building, Planning, Tax Assessor, and Health Departments);
- City of Berlin Historical Society; and
- City of Berlin Fire Department.

The environmental files at Fraser were limited. Based upon discussions with Ms. Tammie Lavoie, Environmental Specialist, the majority of files were purged from the facility during the bankruptcy process in 2002 and 2003. The files that GZA did review at Fraser were general summaries of current plant operations and contained limited information on historic practices and releases. GZA interviewed Ms. Lavoie to answer questions regarding the information that GZA did uncover from the various sources. Ms. Lavoie also provided GZA access and answered questions regarding current facility operations during several site visits during the planning of the exploration program. Ms. Lavoie was our primary site contact to provide historical information, as well as to facilitate the exploration program.

The information that was reviewed at the NHDES WMD primarily included past submittals regarding permit-required reports for the landfill and wastewater operations. Also, there were considerable reports on specific site areas beyond the scope of this project; mainly, the T1 Transformer site and the Cell House site. Included in the NHDES WMD files was useful information of site history and past environmental site assessment reports provided in reports prepared by Tighe & Bond and H&A.

The Northern Forest Heritage Park and the above-referenced City of Berlin Departments provided the majority of historical documents of the site. The information included historical aerial photographs, insurance maps, spill reports, underground storage tank (UST) and AST information. Collectively, the data from these sources allowed GZA to develop an understanding of the sequence of development at the sites and the general operations that prevailed at various time periods. GZA also purchased the electronic tax map for the City of Berlin, which provided the base map for the site plan maps for the Cascade Mill.

The information that was collected was organized based on the Cascade or Burgess Mill, as well as type of issue (i.e., USTs, ASTs, spills, etc). The considerable quantity of information that was gathered was organized in a project-specific file. It was the intent of GZA's work to identify the pertinent information in a summary fashion for presentation in this report. Where applicable, the information that is presented is referenced to the original source. The pertinent information collected is summarized in tables and figures as presented in subsequent sections of this report.

The GIS system was utilized to identify certain environmental issue areas on the two sites. The various categories of issues are presented on layers within the GIS database. The GIS system was developed so that future environmental information can be added to the database.

The information reviewed focused on chemical usage and storage and was organized with the GIS system as follows:

- USTs;
- ASTs;
- Spills; and
- Current and historic storage and usage of petroleum and chemical products locations.

3.2 HISTORICAL INFORMATION

3.2.1 Current Site Use – Burgess Mill

Site operations currently include the production of wood pulp for shipment offsite for use in papermaking. This process involves the chipping of wood, digesting the wood chips (pulping), reducing, screening, washing the pulp, and finally bleaching the pulp using chlorine dioxide. Operations ceased in September 2001 due to bankruptcy proceedings and recently began operations in Spring 2002. The primary pulp mill operations are located on the southern side of the river. Railroad tracks run in a general east/west direction through the center of the parcel. On the northern side of the river are the mill main offices, the former Research and Development building, and the former Bermico Pipe Mill and Stiling Mill. GZA developed our understanding of current site use based upon our discussions and site tours with Ms. Lavoie. GZA's site reconnaissance was limited to the exterior portions of the site, and we were not granted permission to view interior portions of the site. During the site visits, GZA's confirmed the locations of site buildings and pertinent features that were identified on the base map for the site.

3.2.2 Current Site Use – Cascade Mill

Site operations currently include the paper making operations and roll stock storage. On the western side of the property, adjacent to Cascade Flats Road, are warehouses used primarily for roll storage. The filter plant, power station, chemical storage, pulp storage, clay handling, thickening, old digester, machine shop, roll grinding, shipping, paper machines, and paper storage are located at the center of the property. Numerous ASTs are associated with the process of mill plant operations. GZA developed our understanding of current site use based upon our discussions and site tours with Ms. Lavoie. GZA's site reconnaissance was limited to the exterior portions of the site, and we were not granted permission to view interior portions of the site.

At the northern end of the Site is the Boiler House and tank fuel storage area, where oil is stored and transferred from rail cars to a No. 6 fuel oil tank. Two railcars of No. 6 fuel oil are stationed in this area adjacent to the AST.

The base map for the Cascade Mill site was developed from existing site plans. During the site visits, GZA updated the plans to reflect current conditions and confirmed building locations and features with mill personnel.

3.3 SUMMARY OF ENVIRONMENTAL ISSUES

3.3.1 Underground Storage Tanks

Reportedly, there are no USTs currently present at the two sites. Please refer to **Figures 4** and **5** for the approximate locations of former USTs (shown as to the extent possible based on the available information). A review of the NHDES website and a H&A report entitled "Report on ASTM Phase I Environmental Site Assessment Pulp and Paper of America Burgess Mill Berlin, New Hampshire," dated February 2002, indicated that 18 USTs were removed from the Burgess Mill and Cascade Mill facilities between 1986 and 1996. In addition, a draft report entitled "Preliminary Draft Limited Environmental Assessment Crown vantage Pulp & Paper Mills Berlin and Gorham, New Hampshire" prepared by Tighe & Bond dated April 1999 indicates that an additional 10 USTs were removed from the Burgess Mill facility prior to 1986.

Tighe & Bond reported, "*that USTs were excavated without any significant petroleum contamination.*" Final closure reports for the UST removals after 1986 were submitted to the NHDES. **Table 1 – *Underground Storage Tank Removals*** provides a summary of the tank removals performed at the Burgess Mill facility. GZA did not observe any USTs during our site visits.

3.3.2 Aboveground Storage Tanks

GZA developed an inventory of ASTs based on review of the above-referenced H&A and Tighe & Bond reports. The information indicates that on May 22, 1998 Crown Paper registered "*26*" ASTs at the Burgess Mill in Berlin, New Hampshire for heating, used oil, gasoline, generators and machinery and "*33*" ASTs at the Cascade Mill in Gorham, New Hampshire for heating, used oil, gasoline, generators and machinery. The registration process was directed to meet State of New Hampshire regulations for ASTs.

GZA observed several ASTs located at the Burgess and Cascade Mill facilities. The Cascade and Burgess Mills maintain ASTs for the storage of petroleum and chemical products including, gasoline, diesel fuel, No. 6 fueling oil, No. 2 heating oil, lubricating oil, gear oil, waste/used oil, hydrogen peroxide, liquors, sulfuric acid, and caustic soda. Most of the petroleum tanks were observed to have some type of secondary containment that includes a dike, overfill protection, and alarm vents. The majority of ASTs were being reported to document the closure status of the storage tanks. ASTs that are still active were reported to be in compliance. **Table 2 - *Petroleum Aboveground Storage Tanks for Burgess Mill*** and **Table 3 - *Petroleum Aboveground Storage Tanks for Cascade Mils*** summarize the storage locations, product stored, capacity, and status for each respective facility. **Figure 4** depicts the locations of several ASTs that were included within the study area.

Certain ASTs areas were observed during the Site reconnaissance, and GZA identified areas where there was evidence of a release to the environment (i.e. visible staining on the ground). AST areas with visible stained soils includes:

- Burgess Mill – No. 6 fuel storage tank on western side of river;
- Burgess Mill – Two Diesel ASTs on southern side of wood room;
- Burgess Mill – No. 6 fuel oil tank on eastern side of demineralization building;

- Cascade Mill – Railcars of No. 6 fuel and associated No. 6 fuel tank; and
- Cascade Mill – West of pulp and paper waste building adjoining railroad tracks.

3.3.3 Releases and Spills

On April 30, 2003, a GZA representative requested information from the Berlin Fire Department requesting hazardous spills, leaks, or releases files. On May 2, 2003, GZA received copies of all spills, leaks and releases that the Berlin Fire Department was involved with from 1988 – 2000. In addition, GZA reviewed the reports prepared by H&A and Tighe & Bond as indicated in the above sections. A summary of spills recorded by the Fire Department and the consulting firms for the Site are provided in **Table 4** and **Table 5** for Burgess Mill and Cascade Mill, respectively. Review of NHDES files indicates past releases of polychlorinated biphenyls from transformers in the T-1 area of the Site. This has had previous environmental studies conducted and it was specifically excluded from GZA work areas. **Figures 4** and **5** depict identifiable spill locations for Burgess Mill and Cascade Mill, respectively. The key site contact, Ms. Lavoie, assisted GZA identifying possible locations of releases.

3.3.4 Storage and Uses

Based on information reviewed in the draft report entitled "Preliminary Draft limited Environmental Assessment Crown Vantage Pulp & Paper Mills Berlin and Gorham, New Hampshire" prepared by Tighe & Bond, dated April 1999, there was a chemical manufacturing facility located at the far northern end of the Burgess Mill property used to manufacture chlorine and caustics. Only the foundations from tanks and buildings remain from this former chemical plant. This portion of the Site was not included in the GZA study area, and as such so no further work was conducted. GZA obtained hazardous materials storage locations from the City Hall Tax Assessor's office and the Berlin Fire Department. **Figures 4** and **5** depict the locations of the chemical storage areas provided by the above-referenced agencies. **Table 6** - *Non-Petroleum Storage Tanks* is provided to identify the storage tanks located at the Burgess Mill facility.

4.0 FIELD EXPLORATION, SAMPLING, AND ANALYTICAL PROGRAMS

Based upon the information obtained during the site history and reconnaissance tasks, a field exploration, sampling, and analytical program was developed to evaluate subsurface conditions at both the Burgess and Cascade Mills. Subsurface explorations were conducted at locations approved by Nexfor relative to underground utilities. The general technical approach for the exploration program was to install groundwater monitoring wells at anticipated downgradient locations on both sites and to analyze groundwater quality to be indicative of site-wide potential contamination issues. The exploration program was considered a "Phase I" program intended to investigate the subsurface conditions broadly and focus subsequent exploration programs to issues identified during this study. Further, due to the long history of site usage, the large site areas, and the chemical handling and storage practices throughout the site that changed with time, the exploration strategy followed during this study provided an approach to evaluate overall groundwater quality at both sites. The approach recognizes that, due to the long complex historical site usage, certain environmental issues may not be identified by this study; however, by evaluating groundwater quality at the downgradient site boundaries potential receptors to groundwater contamination can be addressed. Certain specific environmental areas of concern identified during Task 3 were also addressed during the exploration program.

The subsurface exploration program consisted of drilling 38 test borings with 36 monitoring well installations, and conducting 30 hand auger probes. Soil samples were collected for analysis from the test borings and hand augers. Test pits were not excavated due to concerns by Nexfor related to subsurface utilities. Groundwater samples were collected for analysis from the monitoring wells. Groundwater depths were recorded at each monitoring well and referenced to a site datum. Reference elevations were determined based on a level elevation survey that included each test boring location. Test boring logs and monitoring well construction details are included in **Appendix B**.

Borings were drilled using a conventional drill rig, mounted on a large rubber-tired, all-terrain-type vehicle. Borings were drilled and monitoring wells constructed in accordance with Env-Wm 1403.27 (*Groundwater Monitoring Wells*) and D 1586 - 84 (*Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils*). Test borings were advanced using drive and wash techniques where shallow groundwater was anticipated and Opposite Directional Exploration (ODEX) techniques in areas with anticipated bouldery fill or shallow bedrock. Bedrock explorations were advanced using a 3.5-inch-diameter air hammer. The air hammer could be continued immediately following completion of the ODEX drilling as the ODEX hammer could be removed without removal of the casing.

Groundwater monitoring wells were generally installed such that the screened section of the well intersected the anticipated range of groundwater surface elevation fluctuations. Groundwater monitoring wells were completed with protective flush-mounted road boxes. In the event that the overburden groundwater was not encountered, a bedrock monitoring well was installed such that the screened interval did not intersect the overburden/bedrock interface. This interface was sealed with bentonite at all bedrock monitoring locations.

Soil samples were collected at standard five-foot sampling intervals to characterize overburden hydrogeology and continuously as needed to evaluate soil quality. Soil samples were field screened for total volatile organic compounds (VOCs) using a photoionization detector (PID), and examined for visual and olfactory evidence of soil contamination. Results of soil field screening can be found on the boring logs contained in **Appendix B**.

4.1 SUBSURFACE EXPLORATIONS – BURGESS MILL

Twenty-seven soil borings (GZ-1 through GZ-27) were drilled by New Hampshire Boring (NHB) of Londonderry, New Hampshire from October 13 through October 29, 2003. Test borings were located in areas to provide general water quality conditions, as well as potential areas of environmental concern identified in previous work completed at the site. These areas included a former UST located adjacent to the scale house (GZ-4), the railroad repair shop (GZ-5 through GZ-9), the No. 6 Bulk Storage Area (GZ-18), and the No. 6 fuel oil AST (GZ-24 through GZ-26). The remaining test borings were installed at locations across the Burgess Mill in order to ascertain general subsurface/environmental conditions throughout the mill. Locations were selected to provide groundwater quality data for downgradient locations along the site boundaries. Additionally, certain boring locations were selected to evaluate potential hydrogeologic contaminant pathways.

Twenty-two hand auger probes (SS-1 through SS-22) were conducted from October 16 through October 22, 2003. Auger probes were generally conducted in areas of surficial staining, previous spills, or adjacent to ASTs that were inaccessible to a conventional drill rig.

4.2 SUBSURFACE EXPLORATIONS - CASCADE MILL

Eleven soil borings (GZ-28 through GZ-38) were drilled by NHB from October 30 through November 4, 2003. Borings GZ-28 through GZ-36 were completed as monitoring wells. Selected test borings were located in areas of potential environmental concern identified in previous work completed at the site. These areas included the pump house adjacent to a former No. 6 oil spill (GZ-36 through GZ-38) and the wastewater collection system lift station (GZ-32). The remaining test borings were installed at locations across the Cascade Mill in order to ascertain general subsurface/environmental conditions throughout the mill. Similar to the approach for the Burgess Mill, locations were selected to provide groundwater quality data at the downgradient site boundary.

Eight hand auger probes (SS-23 through SS-30) were conducted on October 22, 2003. Auger probes were generally conducted in areas of surficial staining or ASTs that were inaccessible to a conventional drill rig.

4.3 SOIL SAMPLING AND ANALYTICAL PROGRAMS

Soil samples collected from test borings and hand auger probes were selected for laboratory analysis of VOCs by Environmental Protection Agency (EPA) Method 8260 based on visual/olfactory or PID screening results. Additional soil samples for polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), and Resource Conservation and Recovery Act Eight (RCRA-8) metals were collected based on the same criteria. Soil samples were sent to Eastern Analytical, Inc. (EAI) of Concord, New Hampshire.

4.4 GROUNDWATER SAMPLING AND ANALYSIS

GZA collected water quality samples from the 36 groundwater monitoring wells installed as summarized in **Sections 4.1** and **4.2** to evaluate overburden and bedrock groundwater quality on November 13 and 14, 2003. Groundwater samples were collected from the monitoring wells approximately two weeks following well installation. A minimum of three well volumes of groundwater were removed from the wells during development prior to the initial sampling round.

Groundwater samples were collected in accordance with NHDES and EPA protocols. Groundwater samples were submitted to EAI for analytical laboratory analyses in accordance with the following table. Overburden groundwater samples for dissolved metals analyses were field filtered using a 0.45-micron filter. Groundwater samples were containerized, transported, and analyzed in consideration of applicable NHDES and EPA protocols. Groundwater samples were also screened in the field for general water quality indicator and natural attenuation indicator parameters including dissolved oxygen (DO), oxidation-reduction potential (ORP), pH, specific conductance, and temperature.

In general, monitoring locations were sampled for PAHs in areas of former USTs (GZ-4), current ASTs (GZ-18 and GZ-24 through GZ-27), at monitoring locations with observed soil staining (GZ-5 through GZ-9 and GZ-20) and at monitoring locations downgradient of known spills (GZ-33 and GZ-36). RCRA-8 metals were sampled in locations adjacent to heavy railroad traffic and observed surficial ash (GZ-5, GZ-6, GZ-9, GZ-10, GZ-11, GZ-22, GZ-24, GZ-26, and GZ-28), background locations (GZ-4), and downgradient locations (GZ-15, GZ-16, GZ-17, and

GZ-33). Sulfate was sampled at background locations (GZ-4 and GZ-27) and areas of known chemical usage and storage (GZ-15, GZ-16, GZ-17, GZ-18, and GZ-29). The following table depicts the groundwater sampling rationale at both sites.

Location Rationale	Location ID	VOCs	PAHs	RCRA-8 Metals	Sulfate
Community Street (Downgradient Locations)	GZ-1	X			
	GZ-2	X			
	GZ-3	X			
Scale House UST (Upgradient Location)	GZ-4	X	X	X	X
Railroad Repair Shop	GZ-5	X	X	X	
	GZ-6	X	X	X	
	GZ-7	X	X		
	GZ-8	X	X		
	GZ-9	X	X	X	
Area of Past Railroad Activity	GZ-10	X		X	
	GZ-11	X		X	
Adjacent or Downgradient of Mill Activities	GZ-12	X			
	GZ-13	X			
	GZ-14	X			
Downgradient Locations to Kraft pulping process and No. 6 Bulk Storage Area	GZ-15	X		X	X
	GZ-16	X		X	X
	GZ-17	X		X	X
	GZ-18	X	X		X
	GZ-19	X			
Adjacent to various mill activities	GZ-20	X	X	X	
	GZ-21	X			
	GZ-22	X		X	
Sidegradient to mill operations	GZ-23	X			
Adjacent and downgradient to former Bermico Mill and 500,000-gallon No. 6 fuel oil tank	GZ-24	X	X	X	
	GZ-25	X	X		
	GZ-26	X	X	X	
	GZ-27	X	X		X
Upgradient location	GZ-28	X		X	
Adjacent to mill activities including sulfite storage	GZ-29	X		X	X
Downgradient locations to all Cascade Mill processes	GZ-30	X			
	GZ-31	X			
	GZ-32	X			
	GZ-33	X	X	X	
	GZ-34	X			
	GZ-35	X			
Adjacent to Pump House Spill	GZ-36	X	X		

Note:
Indicates duplicate samples were collected for the parameters

4.5 LEVEL ELEVATION SURVEY

GZA conducted a level elevation survey of newly installed groundwater monitoring wells at each mill on November 6, and 7, 2003. The level elevation survey was performed using standard optical survey techniques and referenced to an on-site benchmark of 1079.42[2] feet above mean sea level. The benchmark is located in the concrete footing of a metal support tower located approximately 100 feet northeast of GZ-21. The benchmark for the Cascade Mill survey is 863.50[3] feet above mean sea level located on the top of a manhole cover located adjacent to the Androscoggin River near the northernmost portion of the retaining wall. The data from the level elevation survey were used with depth-to-groundwater data to estimate the direction of shallow overburden groundwater flow beneath the site and groundwater seepage velocity.

GZA also installed a staff gauge at each mill within the Androscoggin River adjacent to the site and surveyed the elevation of a reference point on the gauge.

4.6 HYDRAULIC TESTING

Hydraulic testing of subsurface soils at monitoring locations including GZ-1, GZ-4, GZ-5, GZ-10, GZ-11, GZ-27, GZ-28, GZ-31, GZ-33, and GZ-36 was conducted on November 12, 2003 by performing rising head tests within groundwater monitoring wells. Hydraulic testing was performed using standard slug test methods. Testing was conducted over a period of time to allow water levels to rise into the wells. A MiniTROLL pressure transducer connected to an In-Situ data logger at monitoring wells with sufficient well and water depth to accommodate the pressure transducer. The tests were performed using a rising head method in which a slug of known volume is placed in the monitoring well. The groundwater level in the well is allowed to return to the static water level measured prior to the insertion of the slug. The slug is then removed, and the water level response is measured by the pressure transducer and recorded by the data logger, starting at intervals of 0.3 seconds and increasing on each log cycle. Locations were selected in overburden wells with greater than 4 feet of standing water that would allow for an understanding of general hydraulic conductivity across each mill property.

5.0 SUBSURFACE CONDITIONS

5.1 SOIL/BEDROCK CONDITIONS

5.1.1 Burgess Mill

A published surficial geologic map[4] (Williams 1943) indicates that the Burgess Mill is underlain by the Canaan Stony Fine Sandy Loam. This material is described as a gray, fine sand underlain by yellowish-brown, fine sandy loam at a depth of 1/2 foot. At approximately 12 to 14 inches, the soil color becomes lighter with depth until 22 to 24 inches where it changes to a

[2] H. Edmund Bergeron, North Conway, New Hampshire, 1986, No. 32.

[3] Manhole # C-1 from a Chas. T. Main plan entitled "Cascade Mill Process Waste Collection Sheet #1" dated April 20, 1976.

[4] B.H. Williams, Soil Survey of Coos County, New Hampshire, Division of Soil Survey, Bureau of Plant Industry, United States Department of Agriculture, 1943.

gray, gritty, glacial till which extends to bedrock. Review of published bedrock geologic information[5] (Marland 1975) describes bedrock as a medium-grained, pink to gray, granulated biotite quartz monzonite.

In general, the subsurface soils encountered within the test borings conducted by GZA consisted of fill underlain by either dense olive to gray, fine to coarse sand with varying amounts of silt or bedrock[6]. The fill varied in depth from 2.5 feet to approximately 24 feet (GZ-15) below ground surface. Where present, the fill generally consisted of a medium dense to dense, brown to black, fine to coarse sand, some gravel with varying amounts of silt, wood, and ash. **Figure 6** depicts bedrock elevation contours for the mill. In general bedrock slopes to the west toward the Androscoggin River until reaching a trough that runs in a southwestern direction approximately coincident with GZ-14 and GZ-1. To the west of the trough, bedrock slopes in a southern direction away from the river. The trough may be a former stream channel at the Androscoggin River and was evaluated as a potential preferential pathway for groundwater flow.

5.1.2 Cascade Mill

Williams (1943) indicates that the Cascade Mill is underlain by the Canaan Stony Fine Sandy Loam. This material is described as a brown or light brown, sandy loam to a depth of 6 to 8 inches underlain by rust-brown sandy loam at a depth of 1 foot. At this depth, the soil color becomes lighter with depth until 24 to 26 inches where it changes to gray, gravelly sand. Marland (1975) describes bedrock as a medium-grained pink to gray, granulated biotite quartz monzonite.

In general, the subsurface soils encountered within the test borings consisted of fill underlain by either a brown, silt & clay or medium dense, brown, gravel. Where present, the fill varied in depth from 3 feet to approximately 15.5 feet (GZ-35) below ground surface. The fill generally consisted of a loose to medium dense, brown to gray, fine to coarse sand, some gravel with varying amounts of silt, wood, brick, and ash. Bedrock elevation contours could not be generated for this site as bedrock was only encountered in four of the eleven test boring locations.

5.2 GROUNDWATER FLOW

5.2.1 Burgess Mill

The groundwater surface was encountered between 1.7 feet (GZ-9) to 35.1 feet (GZ-17) beneath the site within overburden and shallow bedrock on November 6, 2003. **Table 7** summarizes two rounds of groundwater elevation data collected at the site. **Figure 7** shows groundwater elevation contours based on the water level measurements made at the site. The estimated direction of overburden groundwater flow is generally toward the west to southwest and the hydraulic gradient across the site ranges from about 0.03 to about 0.04.

---

[5] Marland P. Billings, et. al, Geology of Gorham Quadrangle New Hampshire-Maine, State of New Hampshire Department of Resources and Economic Development, 1975.

[6] Soil samples classified using Modified Burmeister Soil Classification System.

5.2.1.1 Hydraulic Conductivity

Slug test water level data were evaluated using a variable head form of the Hvorslev Equation given by (Hvorslev, 1951[7]):

$$K_h = \frac{d^2 . ln\left(\frac{2mL}{D}\right)}{8 L (t_2 - t_1)} ln \frac{H_1}{H_2} \qquad where \quad \frac{mL}{D} > 4$$

Where:

D	=	diameter of intake (length)
d	=	diameter of stand pipe (length)
L	=	length of intake (length)
H_1	=	Piezometric head for $t = t_1$ (length)
H_2	=	Piezometric head for $t = t_2$ (length)
t	=	Time
K_h	=	Horizontal permeability (length/time)
m	=	Transformation ratio = $\sqrt{K_h / K_v}$ *(dimensionless)* = 1.0

Semi-log plots of normalized water level versus time are prepared, and values of H and t selected. The above equation is then used to estimate hydraulic conductivity. Plots of water level response data are attached in **Appendix C**.

The results of the hydraulic testing of the groundwater monitoring wells at the Burgess Mill are summarized in the following table.

Well ID	Hydraulic Conductivity (cm/sec)	Material Intersected by Well Screen
GZ-1	6.2E-03	Fill, Sand, some gravel
GZ-4	2.3E-04	Fill, Sand, some gravel
GZ-5	5.6E-03	Gravel, some sand
GZ-10	3.9E-04	Sand, some Gravel
GZ-11	4.9E-04	Sand, some Gravel, some Silt
GZ-27	5.9E-04	No samples collected
Geometric Mean	9.8E-04	

NOTE: cm/sec = cubic meter per second

Assuming an average hydraulic conductivity of 9.8×10^{-4} cm/sec, an hydraulic gradient of 0.04 (based on overburden water levels collected on November 6, 2003) and an effective porosity of 0.20 (based on typical published values, Fetter, 1988[8]), a seepage velocity (Vs) of 2.0×10^{-4} cm/sec (207 feet/year) was estimated based on the following relationship in (Fetter 1988):

[7] Hvorslev, M.J., 1951, Time Lag and Soil Permeability in Groundwater Observations, U.S. Army Corps of Engineers, Waterways Exp. Sta. Bull. 36, Vicksburg, Miss.

[8] Fetter, C.W., 1988, Applied Hydrogeology, Merrill Publishing Company, 592 p.

$$Vs = \frac{Kdh}{n_{ed}dl}$$

Where: K = Hydraulic conductivity (9.8×10^{-4} cm/sec)
dh/dl = Hydraulic gradient (0.04)
n_{ed} = Effective Darcian porosity, which is equal to the Darcian pore factor, *dpf*, times the effective porosity, (estimated as 0.2)

5.2.2 Cascade Mill

The groundwater surface was encountered between 4.1 feet (GZ-36) to 40.4 feet (GZ-35) beneath the site within the overburden on November 5, 2003. **Table 8** summarizes two rounds of groundwater elevation data collected at the site. **Figure 8** shows groundwater elevation contours based on the water level measurements made at the site on November 5, 2003. Based on the estimated groundwater table surface the direction of overburden, groundwater flow is anticipated to be generally toward the east to southeast and the estimated hydraulic gradient across the site is 0.06.

5.2.2.1 Hydraulic Conductivity

Slug test water level data were evaluated using a variable head form of the above Hvorslev Equation. The results of the hydraulic testing of the groundwater monitoring wells at the Cascade Mill are summarized in the following table.

Well ID	Hydraulic Conductivity (cm/sec)	Material Intersected by Well Screen
GZ-28	1.6E-03	Fill, Sand, some Gravel
GZ-31	3.6E-03	Fill, Sand
GZ-33	8.4E-04	unknown
GZ-36	1.2E-03	Fill, Sand, trace Gravel
Geometric Mean	1.6E-03	

Assuming an average hydraulic conductivity of 1.6×10^{-03} cm/sec, a hydraulic gradient of 0.06 (based on overburden water levels collected on November 5, 2003), and an effective porosity of 0.20 (based on typical published values in Fetter, 1988), a seepage velocity (Vs) of about 4.8×10^{-04} cm/sec (496 feet per year) can be estimated based on the following relationship in Fetter (1988):

$$Vs = \frac{Kdh}{n_{ed}dl}$$

Where: K = Hydraulic conductivity (1.6×10^{-3} cm/sec)
dh/dl = Hydraulic gradient (0.06)
n_{ed} = Effective Darcian porosity, which is equal to the Darcian pore factor, *dpf*, times the effective porosity, (estimated as 0.2)

6.0 SOIL FIELD SCREENING AND ANALYTICAL RESULTS

6.1 BURGESS MILL

6.1.1 Field Screening

PID screening detected the presence of VOCs within soil samples collected from three of the twenty-seven test borings performed. The PID screening readings ranged from 0.3 to 20 parts per million (ppm) in samples obtained from depths ranging between 0 to 17 feet below ground surface. A summary of sample locations, depths and PID screening readings of 1 ppm or greater are presented in the following table.

Well ID	Sample Depth (feet below ground surface)	PID Reading (ppm)
GZ-1	5 - 7	1.9
	15 - 17	1.0
GZ-4	5 - 6.6	1.0
GZ-20	1 - 1.3	20
	5 - 7	1.1
	9 - 11	2.4

PID readings are not considered to represent actual concentrations of VOCs in a sample; however, the results are useful as a guide to determine if additional testing should be conducted on a particular sample. The PID does not differentiate between individual VOCs nor is it able to detect all VOCs. The PID screening results are also presented in the test boring logs in **Appendix B**.

6.1.2 Analytical Results

A summary of the results of laboratory analyses for soil samples collected during this study is included in **Table 9** and shown referenced to sample location in GZA's GIS database. In general, the majority of detected compounds were PAHs and metals found in areas with visible soil staining or past spills or storage of petroleum products. Analytical laboratory reports are included in **Appendix D**.

The summary of Method 1 Soil Standard exceedances for VOCs from the test boring and hand auger probes is included in the following table.

Well ID	Compound	Concentration (mg/kg)	S-1 Soil Standard (mg/kg)
GZ-7	Benzo (a) anthracene	7.5	0.7
	Benzo (a) pyrene	6.5	0.7
	Benzo (b) fluoranthene	12	7
	Indeno {1,2,3-cd] pyrene	1.8	0.7
	Mercury	18	13
SS-5	Arsenic	27	11
SS-15	Benzo (a) anthracene	1.3	0.7
SS-19	Benzo (a) anthracene	26	0.7
	Benzo (a) pyrene	13	0.7
	Benzo (b) fluoranthene	8	7

Well ID	Compound	Concentration (mg/kg)	S-1 Soil Standard (mg/kg)
SS-21	Benzo (a) anthracene	110	0.7
	Benzo (a) pyrene	74	0.7
	Benzo (b) fluoranthene	92	7
	Benzo (k) fluoranthene	38	7
	Chrysene	130	70
	Dibenz [a,h] anthracene	16	0.7
	Indeno {1,2,3-cd] pyrene	33	0.7

NOTE: mg/kg = milligrams per kilogram

Laboratory results indicate that the majority of compounds that exceed their respective soil standards were PAHs with the exception of mercury at GZ-7 (5-7') and arsenic at SS-5 (0-6"). No VOCs were detected at concentrations exceeding their respective soil standards. In general, PAH exceedances occurred in areas of known environmental concern. GZ-7 is located adjacent to the railroad repair shop, SS-5 is adjacent to the storage area for drums containing metal plate waste, SS-15 is located in a former spill area, SS-19 is adjacent to a past spill of presumed petroleum product, and SS-21 is in the immediate vicinity of a AST foundation associated with the former Bermico Pipe Mill. GZ-7 and SS-5 exceeded their respective standards for mercury and arsenic, respectively. Both samples were obtained from locations with heavy railroad traffic.

6.2 CASCADE MILL

6.2.1 Field Screening

PID screening detected the presence of VOCs within soil samples collected from two of the eleven test borings performed. The PID screening readings ranged from 1.6 to 3.4 ppm in samples obtained from depths ranging between 0 to 11 feet below ground surface. A summary of sample locations, depths and PID screening readings of 1 ppm or greater are presented in the following table.

Well ID	Sample Depth (feet below ground surface)	PID Reading (ppm)
GZ-30	0 - 2	3.4
GZ-31	9 - 11	1.6

The PID screening results are also presented in the test boring logs in **Appendix B**.

6.2.2 Analytical Results

A summary of the detected laboratory analytical data for soil samples collected during this study are listed in **Table 10** and shown referenced to sample location in GZA's GIS database. Analytical laboratory reports for the soil samples collected for the Cascade Mill are included in **Appendix D**. In general, the majority of detected compounds were PAHs and VOCs found in areas with soil staining adjacent to ASTs or past spills.

The summary of Method 1 Soil Standard exceedances for VOCs from the test boring and hand auger probes is included in the following table.

Well ID	Compound	Concentration (mg/kg)	S-1 Soil Standard (mg/kg)
GZ-32	Chloroform	1.3	0.1
SS-26	Benzo (a) anthracene	3.9	0.7
	Benzo (a) pyrene	3.1	0.7
	Indeno {1,2,3-cd] pyrene	1.1	0.7
SS-27	Benzo (a) anthracene	1.1	0.7
	Benzo (a) pyrene	1.1	0.7
SS-30	Benzene	14	5
	Naphthalene	0.6	0.3

Laboratory results indicate that the majority of compounds that exceed their respective soil standards were PAHs with the exception of chloroform at GZ-32 (5-7'), and benzene and naphthalene at SS-30 (0-6"). No metals were detected at concentrations exceeding their respective soil standards. In general, VOC and PAH exceedances occurred in areas of known environmental concern. SS-26 represented a sample of stained soil collected adjacent to the No. 6 fuel oil AST railroad cars. SS-27 is located in an area of past spillage adjacent to the north-south railroad tracks. SS-30 is located next to a current AST near the former truck repair shop. GZ-32 is located downgradient of the wastewater pump station.

7.0 GROUNDWATER FIELD SCREENING AND ANALYTICAL RESULTS

7.1 BURGESS MILL

7.1.1 Field Screening

Results of pH, specific conductance, temperature, DO, and oxidation-reduction potential ORP are presented in **Table 11**. The results indicate the measured values of these parameters are generally within ranges considered typical of groundwater in industrial areas. The pH values for groundwater samples tested generally ranged from 5.9 (GZ-10) to 11.2 (GZ-2). These should be considered typical for similar hydrogeologic settings in New Hampshire with the exception of the 11.2 value. It is likely that a spill of caustic material occurred in the general vicinity of this monitoring location. The specific conductance values for groundwater samples ranged from 10 micromhos/cm (*u*mhos/cm) (GZ-16) to 8,180 *u*mhos/cm (GZ-2). In general, monitoring locations with values greater than 1,500 umhos/cm (GZ-1, GZ-2, GZ-4, GZ-12, GZ-13, GZ-17, GZ-20, GZ-23, and GZ-26) are situated on or in close proximity to areas with de-icing practices that may result in elevated inorganic species in shallow groundwater. Measurements of DO ranged from 0.43 milligrams per liter [mg/L] (GZ-2) to 6.67 mg/L (GZ-16). The measured DO concentrations generally indicate aerobic groundwater conditions; however, DO measurements of groundwater samples from wells GZ-1, GZ-2, GZ-6, GZ-15, and GZ-25, appear depressed (i.e., less than 1.0 mg/L) relative to anticipated values for shallow groundwater systems in the absence of organic material. Likely, this represents residual organic contamination whose degradation requires the use of DO. Field measurements of ORP for water quality samples from groundwater monitoring wells ranged from 154 millivolts [mV] (GZ-26) to -220 mV (GZ-2). ORP measurements of groundwater samples from wells GZ-1, GZ-2, GZ-4, GZ-15, GZ-16, GZ-17, GZ-20, and GZ-23 appear depressed (i.e., less than 0 mV) relative to anticipated values for groundwater systems in the absence of organic material. The ORP values at GZ-16,

and GZ-17 may be due in large part to a deeper groundwater system that is somewhat anaerobic, but the remaining locations represent shallow groundwater that is likely undergoing biodegradation of organic contamination.

7.1.2 Analytical Results

A summary of the results of analytical laboratory testing of groundwater collected during this investigation is listed in **Table 12**. Analytical laboratory reports for the Burgess Mill groundwater samples are included in **Appendix E**. The summary of Ambient Groundwater Quality Standards (AGQS) exceedances for groundwater is included in the following table.

Compound List	Well ID	Specific Compound	Concentration (ppb)	AGQS (ppb)
VOCs	GZ-12	1,1,1-Trichloroethane	610	200
		1,1-Dichloroethene	16	7
	GZ-20	Naphthalene	31	20
	GZ-25	Naphthalene	120	20
PAHs	GZ-6	Benzo (a) anthracene	120	10
		Benzo (a) pyrene	120	10
		Benzo (b) fluoranthene	160	10
		Benzo (k) fluoranthene	99	10
		Chrysene	160	10
		Indeno {1,2,3-cd] pyrene	99	10
	GZ-7	Benzo (a) anthracene	83	10
		Benzo (a) pyrene	79	10
		Benzo (b) fluoranthene	91	10
		Benzo (k) fluoranthene	49	10
		Chrysene	97	10
		Dibenz [a,h] anthracene	20	10
		Indeno {1,2,3-cd] pyrene	45	10
	GZ-20	Benzo (a) anthracene	56	10
		Benzo (a) pyrene	50	10
		Benzo (b) fluoranthene	50	10
		Benzo (k) fluoranthene	50	10
		Chrysene	69	10
		Indeno {1,2,3-cd] pyrene	31	10
		Pyrene	230	210
	GZ-25	Acenaphthene	640	420
		Benzo (a) anthracene	3,400	10
		Benzo (a) pyrene	2,300	10
		Benzo (b) fluoranthene	2,400	10
		Benzo (g, h, i) perylene	1,000	210
		Benzo (k) fluoranthene	1,600	10
		Chrysene	3,600	10
		Dibenz [a, h] anthracene	490	10
		Fluoranthene	6,500	280
		Fluorene	580	280
		Indeno {1,2,3-cd] pyrene	1,000	10
		Phenanthrene	4,400	210
		Pyrene	6,100	210

Compound List	Well ID	Specific Compound	Concentration (ppb)	AGQS (ppb)
PAHs	GZ-27	Benzo (a) anthracene	13	10
		Benzo (a) pyrene	11	10
		Chrysene	15	10
Metals	GZ-5	Arsenic	33	10
	GZ-15	Arsenic	12	10
	GZ-16	Lead	17	15
	GZ-16	Arsenic	33	10
	GZ-22	Arsenic	20	10

NOTE: ppb = parts per billion

In general, monitoring locations that exceed their respective VOC and PAH standards are located in areas of historic environmental concern. GZ-6 and GZ-7 are located on the downgradient side of the railroad repair shop. GZ-12 is located downgradient of the number 6, 7, 9, and 12 boilers. GZ-25 and GZ-27 are located downgradient of the former Bermico pipe mill and the current 500,000-gallon AST, both located to the west of the Androscoggin River. Soil collected from GZ-20 appeared to be contaminated with No. 6 fuel oil, likely resulting in the PAH contamination detected in the groundwater at this location. It is unclear whether exceedances of both arsenic and lead are due to background conditions or manmade sources.

7.2 CASCADE MILL

7.2.1 Field Screening

Results of pH, specific conductance, temperature, DO, and ORP are presented in **Table 13**. The results indicate the measured values of these parameters are generally within ranges considered typical of groundwater in industrial areas. The pH values for groundwater samples tested ranged from 4.6 (GZ-34) to 10.8 (GZ-29). These should be considered typical for similar hydrogeologic settings in New Hampshire with the exception of the 10.8 value. It is unknown why this monitoring location would exhibit an elevated pH level. The specific conductance values for groundwater samples ranged from 16 *u*mhos/cm (GZ-34) to 382 *u*mhos/cm (GZ-36). Based on GZA's experience, these represent typical background values in similar New Hampshire hydrogeologic settings. Measurements of DO ranged from 0.34 mg/L (GZ-30) to 8.02 mg/L (GZ-33). The measured DO concentrations generally indicate aerobic groundwater conditions; however, DO measurements of groundwater samples from wells GZ-30 and GZ-31 appear depressed (i.e., less than 1.0 mg/L) relative to anticipated values for shallow groundwater systems in the absence of organic material. Likely, this represents residual organic contamination whose degradation requires the use of DO. Field measurements of ORP for water quality samples from groundwater monitoring wells ranged from 182 mV (GZ-32) to 0 mV (GZ-30). The measured ORP concentrations generally represent aerobic conditions in site groundwater.

7.2.2 Analytical Results

A summary of the analytical laboratory testing of groundwater collected during this investigation is included in **Table 14**. Analytical laboratory reports for the Cascade Mill groundwater samples are included in **Appendix E**. The summary of AGQS exceedances for groundwater is included in the following table.

Compound List	Well ID	Specific Compound	Concentration (ppb)	AGQS (ppb)
VOCs	GZ-31	Naphthalene	590	20
PAHs	GZ-31	2-methylnaphthalene	320	280
		Acenaphthene	910	420
		Benzo (a) anthracene	2,600	10
		Benzo (a) pyrene	4,300	10
		Benzo (b) fluoranthene	3,400	10
		Benzo (g, h, i) perylene	1,600	210
		Benzo (k) fluoranthene	2,600	10
		Chrysene	4,100	10
		Dibenz [a, h] anthracene	780	10
		Fluoranthene	8,300	280
		Fluorene	1,300	280
		Indeno {1,2,3-cd] pyrene	1,800	10
		Phenanthrene	8,000	210
		Pyrene	8,100	210
	GZ-36	Benzo (a) anthracene	24	10
		Benzo (a) pyrene	12	10
		Benzo (b) fluoranthene	63	10
		Benzo (k) fluoranthene	66	10
		Chrysene	33	10
		Dibenz [a, h] anthracene	14	10
		Fluoranthene	310	280
		Indeno {1,2,3-cd] pyrene	28	10
		Phenanthrene	410	210
		Pyrene	320	210

The source of the VOC and PAH contamination at GZ-31 is unclear at this time. GZ-36 is located adjacent to the pump house in a former No. 6 oil spill area. PAH contamination at this location maybe an artifact of this spill.

8.0 DISCUSSION / SITE CONCEPTUAL MODEL

The quantitative laboratory analyses of soil and groundwater samples collected from explorations conducted at each study area indicate that releases of VOCs and PAHs and likely caustic materials to the environment have occurred. The laboratory analytical data indicate that the majority of VOCs and PAHs detected in soil and groundwater are petroleum hydrocarbons. Site contaminants detected appear to be associated with the on-site storage and handling of petroleum products and process chemicals, and generally were detected at known areas of environmental concern. Information obtained during GZA's historical record review indicates numerous areas of chemical and petroleum storage and cases of documented spills at the sites within the study area. Given the long history of the site, it is likely that undocumented spills have occurred. GZA has developed this conceptual site model to describe site conditions. This site model is a broad description of a large complex site with many sub-sites.

8.1 BURGESS MILL

8.1.1 Hydrogeologic Information

Site soils consist of re-worked sand and gravel fill to a depth ranging from 2.5 feet to approximately 24 feet below ground surface. Where present, the fill generally consisted of a medium dense to dense, brown to black, fine to coarse sand, some gravel with varying amounts of wood, and ash. The fill was generally underlain by fine sand and silt or bedrock. Bedrock generally slopes toward the Androscoggin River until reaching a trough that runs in a southwestern direction approximately coincident with GZ-14 and GZ-1. A bedrock ridge is present between the west of the trough and the river as shown on **Figure 6**. The trough may represent an old river channel that was filled/abandoned re-directing the river to its present day path.

As shown in **Figure 7**, the overburden groundwater elevations generally suggest a west to southwesterly flow direction toward the Androscoggin River from the east and an easterly direction toward the river from the west. Well couplets were not installed during the subsurface exploration program; therefore, no conclusions can be made with regard to vertical flow between bedrock and overburden. An upward gradient would be expected based on site topography. Areas of unsaturated overburden exist in locations adjacent to the Androscoggin River (GZ-2, GZ-3, GZ-12, GZ-17, GZ-18, and GZ-19. This suggests that groundwater in these areas would flow through bedrock prior to discharging into the river. Hydraulic testing at various monitoring locations throughout the mill resulted in estimated hydraulic conductivities ranging from $2.3E^{-04}$ to $6.2E^{-03}$ cm/sec. The average seepage velocity for the mill property was calculated to be $2.0E^{-04}$ cm/sec (207 feet per year). Groundwater flow may locally be affected by the presence of numerous subsurface utilities or subsurface heterogeneities within the fill material. In addition, the trough may locally affect hydraulic gradient or groundwater flow patterns, but there is no evidence to support this based on the limited monitoring locations associated with this phase of work.

8.1.2 Contaminant Distribution

8.1.2.1 Soil

Metals including arsenic, barium, lead, mercury, and selenium were detected in site soils collected from certain test borings. PAHs were also detected in soil samples collected from selected test boring and hand auger locations and indicate past releases. Method 1 Soil Standards were exceeded for benzo (a) anthracene, benzo (a) pyrene, benzo (b) fluoranthene, Indeno {1,2,3-cd] pyrene, benzo (k) fluoranthene, chrysene, dibenz [a,h] anthracene, arsenic, and mercury specifically at the railroad repair shop, the weak liquor storage area, and the Former Bermico Pipe Mill AST pads. Exceedances of the longer chained PAHs heavy weight hydrocarbon products and are consistent with the presence of weathered historic spills of petroleum products. It is unclear whether the metal exceedances can be considered background conditions due to an absence of background soil quality data.

8.1.2.2 Groundwater

Metals including arsenic, barium, chromium, lead, mercury, and selenium were detected in site groundwater collected from various locations.

- *Railroad Repair Shop*: PAHs were detected in groundwater samples collected from wells GZ-5, GZ-6, and GZ-7 immediately downgradient to the railroad repair shop at concentrations exceeding their respective AGQS. In addition, arsenic exceeded its AGQS at GZ-5. PAHs and metals were also detected at the upgradient repair shop monitoring locations (GZ-8 and GZ-9), but did not exceed groundwater standards. VOCs did not exceed AGQS at any monitoring location in this area.

- *500,000-Gallon AST*: PAHs were detected in groundwater samples collected from wells GZ-25 and GZ-27 in the immediate vicinity of the 500,000-gallon No. 6 fuel oil AST at concentrations exceeding their respective AGQS. Naphthalene exceeded AGQS at GZ-25. Metals did not exceed their respective standards at any monitoring location in this area.

- *No. 6 Bulk Oil Storage*: Arsenic were detected in groundwater samples collected from wells GZ-15 and GZ-16 in the general vicinity of the No. 6 bulk fuel oil storage area and the current Kraft pulping process at a concentration exceeding AGQS. VOCs and PAHs did not exceed AGQS in this area. Sulfate was detected at GZ-15, GZ-16, GZ-17, and GZ-18 with elevated sulfate (with respect to the remaining wells) at GZ-15, GZ-17, and GZ-18. Sulfate did not exceed groundwater standards, but elevated sulfate levels are situated in areas downgradient of the former sulfite pulping process.

- *Chlorinated Solvent Area*: VOCs were detected in groundwater samples collected from wells GZ-12 and GZ-13 including trichloroethene, 1,1,1-trichloroethane and their respective daughter products. VOC exceedances of AGQS included 1,1,1-trichloroethane, and 1,1-dichloroethene at GZ-12.

- *Weak Liquor Storage Area*: Selected PAHs exceeded their respective groundwater standards at GZ-20. Elevated pH measurements were recorded at GZ-2 and may be associated with a past release of a caustic substance into fill materials or directly to groundwater.

8.1.3 Contaminant Fate

Metals, PAHs, and VOCs within fill materials associated with past releases likely serve as continuing sources of overburden and bedrock groundwater contamination at the mill property. These contaminants are subject to advective transport mechanisms with groundwater flow toward the Androscoggin River and are subject to natural attenuation along their flow paths. With the exception of the chlorinated solvents detected in samples from GZ-12 and GZ-13, the bulk of the site contaminants would be anticipated to primarily impact shallow groundwater quality due to their physical properties and the anticipated local groundwater discharge conditions at the site. Therefore, the Androscoggin River likely represents the discharge point for contaminated site groundwater and would limit off-site contaminant transport in groundwater beyond the site boundaries. Hydrodynamic dispersion is likely a small component of contaminant migration; however, it is almost certainly less important than advective transport processes given seepage velocities on the order of $2E^{-04}$ cm/sec. Important natural attenuation processes for chlorinated VOCs, and PAHs likely include biologically mediated reductive dehalogenation and anaerobic hydrocarbon degradation respectively due to DO as low as 0.4 mg/L and ORP values as low as -220 mV. Important attenuation processes for metals may include biochemical precipitation reactions, hydrodynamic dispersion and adsorption onto formation materials.

8.2 CASCADE MILL

8.2.1 Hydrogeologic Information

Subsurface soils encountered within the test borings consisted of fill underlain by either a brown, silt & clay or medium dense, brown, gravel. Where present, the fill varied in depth from 3 feet to approximately 15.5 feet below ground surface. The fill generally consisted of a loose to medium dense, brown to gray, fine to coarse sand, some gravel with varying amounts of wood, brick, and ash. For additional information on site soils, please refer to the attached boring logs.

As shown in **Figure 8**, the overburden groundwater elevations generally suggest an easterly to southeasterly flow direction toward the Androscoggin River. Well couplets were not installed during the subsurface exploration program; therefore no conclusions can be made with regard to vertical flow between bedrock and overburden. Unsaturated overburden was not encountered. Consequently, bedrock wells were not installed at this site. An upward gradient is anticipated based on site topography. Hydraulic testing at locations throughout the mill resulted in estimated hydraulic conductivities ranging from $8.4E^{-04}$ to $3.6E^{-03}$ cm/sec. The average seepage velocity for the mill property was calculated to be $1.6E^{-03}$ cm/sec (496 feet per year). Groundwater flow may locally be affected by the presence of numerous subsurface utilities or subsurface heterogeneities within the fill material.

8.2.2 Contaminant Distribution

8.2.2.1 Soil

Various PAHs were detected in soil samples collected from test boring and hand auger locations indicating past releases to the environment. Method 1 soil standards were exceeded for benzo (a) anthracene, benzo (a) pyrene, and indeno {1,2,3-cd] pyrene specifically at the No. 6 fuel oil railcar ASTs and the diesel AST located at the former truck repair shop. Exceedances of the longer chained PAHs indicate heavy weight hydrocarbon products and are consistent with the presence of weathered historic spills of petroleum products. VOCs exceeded their respective standards at GZ-32 (chloroform) and SS-30 (benzene). Metals were not detected within site soils.

8.2.2.2 Groundwater

The metals, including arsenic, barium, chromium, and selenium, were detected in site groundwater collected from various locations.

- *Pump House*: PAHs were detected at GZ-36 at concentrations exceeding their respective AGQS in the immediate vicinity of the pump house where a known spill of No. 6 fuel oil occurred. VOCs were detected at this location, but did not exceed groundwater standards. Metals did not exceed AGQS at any monitoring location in this area.
- *Wastewater Lift Station*: VOCs were detected at GZ-32 including 1,4-dichlorobenzene and carbon disulfide and at GZ-31 (naphthalene) with concentrations exceeding AGQS in the general vicinity of the wastewater lift station. Selected PAHs exceeded their respective groundwater standards at GZ-31. The source of PAH contamination at GZ-31 is unknown. Metals did not exceed AGQS at any monitoring location in this area.

- Throughout the remainder of the site, sulfate was detected at GZ-28, GZ-29, and GZ-30 at low concentrations. Elevated sulfate levels were not observed at the mill. Elevated pH measurements were recorded at GZ-29 and may be associated with a past release of a caustic substance into fill materials or directly to groundwater.

8.2.3 Contaminant Fate

PAH- and VOC-contaminated soils beneath the site likely serve as continuing sources of overburden groundwater contamination at the mill property. These contaminants are subject to advective transport mechanisms with groundwater flow toward the Androscoggin River and are subject to natural attenuation along their flow paths. Hydrodynamic dispersion is likely a small component of contaminant migration; however, it is almost certainly less important than advective transport processes given seepage velocities on the order of $4.8E^{-03}$ cm/sec (496 feet per year). Important natural attenuation processes for VOCs and PAHs likely include biologically mediated anaerobic hydrocarbon degradation based on DO as low as 0.3 mg/L and ORP values as low as 0 mV.

The bulk of the site contaminants would be anticipated to primarily impact shallow groundwater quality due to their physical properties and the anticipated local groundwater discharge conditions at the site. Therefore, the Androscoggin River likely represents the discharge point for contaminated site groundwater and would limit off-site contaminant transport in groundwater beyond the site boundaries.

9.0 CONCLUSIONS

The following are GZA's conclusions based on the data collected during this site investigation:

- Based upon GZA's review of site history, the Burgess and Cascade Mills have a long and complex history of site processes and chemical storage and usage. The exploration program that was conducted during this study was directed toward evaluating potential environmental impacts from identified issue areas, as well as providing a general evaluation of site subsurface conditions. In general, the subsurface data collected are consistent with an industrial site of this nature with specific release areas identified. The site data did not indicate broad contamination issues but rather contamination resulting from specific ongoing or historical practices.
- The Burgess Mill has been used for industrial purposes since 1852. Historical industrial activity at the site has included a sawmill, and pulp/papermaking. Industrial activity has included production of wood pulp for papermaking through the utilization of the sulfite and Kraft processes. The latter process began operations in 1910. The sulfite process was discontinued during the 1960s.
- The Cascade Mill has been used for papermaking purposes since 1903. The pulp prepared at the Burgess Mill is piped underground to the Cascade Mill where it is used in the papermaking process. Currently, additives such as dyes, brighteners, resins, and biocides are used throughout the papermaking process. The mill has processed many types of paper products over the years and currently prepares specialty paper, such as stationery.

- Site soils at both mills consist of re-worked sand and gravel fill with varying amounts of brick, ash, and wood at certain locations overlying natural soils consisting of sand and silt at the Burgess Mill and gravel at the Cascade Mill. At the Burgess Mill, bedrock generally slopes toward the Androscoggin River until reaching a trough that runs in a southwestern direction approximately coincident with GZ-14 and GZ-1. A bedrock ridge is present to the west of the trough and the river. The trough may represent an old river channel.

- Overburden groundwater at each mill flows toward and discharges to the Androscoggin River. At the Burgess Mill, this is a west-southwesterly direction to the east of the river and easterly to the west of the river. At the Cascade Mill, overburden groundwater flows east southeasterly. Based on the presence of the Androscoggin River at the downgradient site boundaries, off-site transport of contaminants in groundwater is not anticipated.

- Method 1 S-1 soil standards were exceeded at the Burgess Mill for benzo (a) anthracene, benzo (a) pyrene, benzo (b) fluoranthene, indeno [1,2,3-cd] pyrene, benzo (k) fluoranthene, chrysene, dibenz [a,h] anthracene, arsenic, and mercury. These exceedances were found in the general vicinity of the railroad repair shop, the former Bermico Mill (SS-21), and the site of a past spill adjacent to SS-19. Further evaluation is needed to determine whether the exceedances of S-1 standards for arsenic and mercury can be considered background conditions.

- Method 1 soil standards were exceeded at the Cascade Mill for benzo (a) anthracene, benzo (a) pyrene, and indeno [1,2,3-cd] pyrene. These exceedances were found in the general vicinity of the pump house, the wastewater lift station, the No. 6 fuel oil AST (SS-26), and a diesel AST adjacent to SS-30.

- Concentrations of certain VOCs exceeded AGQS groundwater standards at the Burgess Mill including 1,1,1-trichloroethane and 1,1-dichloroethene at GZ-12. Selected PAHs exceeded their respective groundwater standards at GZ-6, GZ-7, GZ-20, GZ-25, and GZ-27. These areas correspond to the railroad repair shop, the 500,000-gallon AST, and the general vicinity of weak black liquor storage (GZ-20). The only detected metal concentrations that exceeded AGQS were arsenic and lead. Sulfate did not exceed groundwater standards. It should be noted that elevated pH measurements were recorded at GZ-2 and may be associated with a past release of a caustic substance into fill materials or directly to groundwater.

- The only detected metal concentrations that exceeded AGQS were arsenic and lead. Sulfate did not exceed groundwater standards. It should be noted that elevated pH measurements were recorded at GZ-2 and may be associated with a past release of a caustic substance into fill materials or directly to groundwater.

- Concentrations of certain PAHs in groundwater samples at the Cascade Mill exceeded their respective groundwater standards at GZ-31 (the wastewater lift station) and GZ-36 (the pump house). The presence of PAHs at GZ-36 is likely due to the past or possibly ongoing spill at this location. The source of PAH contamination at GZ-31 is unknown. It should be noted that elevated pH measurements were recorded at GZ-29 and also may be associated with a past release of a caustic.

10.0 RECOMMENDATIONS

Based on the results of GZA's hydrogeologic investigation, we recommend the following:

- Conducting a confirmatory groundwater sampling round in the spring of 2004 at both the Burgess and Cascade Mills. The sampling round should also include measuring groundwater elevations in all on-site monitoring wells to confirm the direction of groundwater flow. Following the performance of the confirmatory sampling round for both sites, a data gap evaluation should be conducted relative to hydrogeologic characterization and contaminant distribution. A supplemental exploration program work plan should be developed to address the data gaps identified.

- Further hydrogeologic evaluations at Burgess Mill to address specific issue areas identified during this study. The hydrogeologic evaluations should address the potential source and distribution contamination in the following areas:

  - The railroad repair shop;
  - 500,000-gallon AST;
  - No. 6 Bulk Oil Storage area;
  - Weak Liquor Storage Area;
  - Former Bermico AST area; and
  - The chlorinated solvent contamination area.

  In addition, subsurface investigations should be conducted inside certain mill buildings in areas of former USTs or spills as well as in areas of hand auger probes where PAH contamination was observed (SS-5, SS-8, SS-15, SS-18, SS-19, and SS-20).

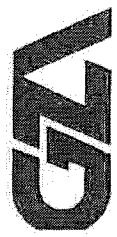
- Further hydrogeologic evaluations at Cascade Mill to address specific issue areas identified during this study. The hydrogeologic evaluations should address the potential source and distribution of contamination in the following areas:

  - The wastewater lift station;
  - The pump house;
  - The rail car ASTs; and
  - The diesel AST in the former truck repair shop.

  In addition, subsurface investigations should be conducted inside certain mill buildings in areas of former USTs or spills as well as in areas of hand auger probes where PAH contamination was observed (SS-27, SS-28, and SS-29). —— ?

- Due to the exceedances of certain AGQS in groundwater samples collected from certain monitoring wells at both sites, and the exceedances of certain S1 soil standards in certain soil samples collected, the Burgess and Cascade Mills should enter the regulatory programs of the New Hampshire Corrective Action process. A Groundwater Management Permit would be an important element of this process, which would include the sampling of selected monitoring wells installed during this study.

TABLES



TABLES

TABLE 1 - UNDERGROUND STORAGE TANK REMOVALS

Burgess Mill

Berlin, New Hampshire

Tank ID	Location	Product Stored	Capacity (gallons)	Installed Date	Temporarily Closed Date	Permanently Closed Date	Assessment Received Date	Sources
1	Cascade WWTP - Front of building	No. 2 Heating Oil	4,000	1/1/1975		9/12/1996	10/3/1996	1,2
10	Filter Plant - East Side	Gasoline	275	1/1/1983		6/4/1990	7/13/1990	1,2
11	Power Department (Tractor Shop) - East Side	Kerosene	2,000	1/1/1980		8/16/1994	10/17/1994	1,2
12	Woodlands Lakeside Camp	Gasoline	1,000	1/1/1975		7/20/1993	8/30/1993	1,2
13	Woodlands Lakeside Camp	Gasoline	1,000	1/1/1975		7/20/1993	8/30/1993	1,2
14	Power Department (Tractor Shop) - West Side	Diesel Fuel	3,000	1/1/1981	12/20/1993	8/16/1994	10/17/1994	1,2
15	Power Department (Tractor Shop) - West Side	Gasoline	3,000	1/1/1981	12/20/1993	8/16/1994	10/17/1994	1,2
16	Power Department (Tractor Shop) - West Side	Used / Waste Oil	500	1/1/1981		11/18/1992	1/21/1993	1,2
17	Power Department (Tractor Shop) - West Side	Used / Waste Oil	500	1/1/1981		11/18/1992	1/21/1993	1,2
18	Scales - South End	No. 2 Heating Oil	1,000	unknown	10/13/1993	8/16/1994	10/17/1994	1,2
2	Cascade Boiler House - West Side	No. 6 Heating Oil	25,000	1/1/1960		12/1/1987		1,2
3	Cascade Boiler House - West Side	No. 6 Heating Oil	25,000	1/1/1960		12/1/1987		1,2
4	Service Garage - West Side (front)	Gasoline	1,000	1/1/1970		12/1/1987		1,2
5	Service Garage - West Side (front)	No. 2 Heating Oil	1,000	1/1/1983		11/18/1992	1/21/1993	1,2
6	Service Garage - West Side (front)	Gasoline	6,000	1/1/1965		12/1/1987		1,2
7	Service Garage - West Side (front)	Diesel Fuel	3,000	1/1/1969		12/1/1987		1,2
8	Service Garage - West Side (front)	Used / Waste Oil	500	1/1/1983		11/18/1992	1/21/1993	1,2
9	Burgess WWTP - Adjacent Building	No. 2 Heating Oil	4,000	1/1/1975		7/20/1993	8/30/1993	1,2
--	Center of Parcel - Heine Plant	No. 2 Heating Oil	12,000	Pre 1960		Removed Prior to 1986		1
--	#11 Unloading (Entrance to Plant)	No. 6 Oil	25,000	Pre 1945		Removed Prior to 1986		1
--	#11 Unloading (Entrance to Plant)	No. 6 Oil	25,000	Pre 1945		Removed Prior to 1986		1
--	#1 Kiln - Under Concentrator Building	No. 6 Oil	6,000	Pre 1945		Removed Prior to 1986		1
--	Central Shops - North Corner	No. 2 Oil	500	unknown		Removed Prior to 1986		1

TABLE 1 - UNDERGROUND STORAGE TANK REMOVALS

Burgess Mill

Berlin, New Hampshire

Tank ID	Location	Product Stored	Capacity (gallons)	Installed Date	Temporarily Closed Date	Permanently Closed Date	Assessment Received Date	Sources
--	Stores Office - North End	Gasoline	1,000	unknown		Removed Prior to 1986		1
--	Stores Office - North End	Gasoline	1,000	unknown		Removed Prior to 1986		1
--	Stores Office - North End	Diesel Fuel	500	unknown		Removed Prior to 1986		1
--	Power Department - South Near Rail Lines	Diesel Fuel	Tank Car	unknown		Removed Prior to 1986		1
--	Baled Pulp Storage - South Near Fence	Methanol	10,000	unknown		Removed Prior to 1986		1

SOURCES:

1. Draft report entitled "*Preliminary Draft Limited Environmental Assessment Crown Vantage Pulp & Paper Mills Berlin and Gorham, New Hampshire*" prepared by Tighe & Bond and dated April 1999.
2. New Hampshire Department of Environmental Services website.

TABLE 2 - PETROLEUM ABOVEGROUND STORAGE TANKS

Burgess Mill
Berlin, New Hampshire

Tank ID	Identity	Product Stored	Install Date	Removal Date	Capacity (gals.)	Status	Comments	Map	Sources
B01	Central Steam Bulk Tank	No. 6 fuel oil	1/1/1968		500,000	active		Y	1,2,3
B02	Central Steam Day Tank	No. 6 fuel oil	1/1/1968		25,000	active		Y	1,2,3
B03	Central Steam No. 2 Oil Tank	No. 2 fuel or waste oil	1/1/1980		1,000	active		Y	1,2,3
B04	Central Steam fuel Additive	waste oil	1/1/1975	6/1/2001	5,000	not in use		Y	1,2,3
B05	#11 Bulk Storage Tank	No. 6 fuel oil	1/1/1967		192,500	active		Y	1,2,3
B06	Lime Kiln Tank	No. 6 fuel oil	1/1/1994		30,000	active		Y	1,2,3
B07	Wood Room #1	diesel fuel	1/1/1994		1,000	active		Y	1,2,3
B08	Wood Room #2	diesel fuel	1/1/1990		1,000	active		Y	1,2,3
B09	Windberg	lube oil	unknown		50	?		N	1,3
B10		hydraulic oil	1/1/1980		300	?		N	1,3
B11	Receiving Deck	hydraulic oil	1/1/1980		300	active		Y	1,2,3
B12	Truck Dumper #2	hydraulic oil	1/1/1997		275	active		Y	1,2,3
B14		kerosene	unknown	1/1/2000	275	removed		Y	1,2,3
B15	Service Garage #1	lube/engine oil	1/1/1994		275	active	Located outside study area	N	3
B16	Service Garage #2	lube/engine oil	1/1/1994		275	active	Located outside study area	N	3
B17	Service Garage #3	lube/engine oil	1/1/1994		275	active	Located outside study area	N	3
B18	Service Garage #4	lube/engine oil	1/1/1994		275	active	Located outside study area	N	3
B19	Service Garage #5	lube/engine oil	1/1/1994		275	active	Located outside study area	N	3
B20	Service Garage Heating Oil #1	No. 2 fuel oil	unknown		275	?	Located outside study area	Y	1,2,3
B21	Service Garage Heating Oil #2	No. 2 fuel oil	unknown		275	?	Located outside study area	N	1,3
B22	Service Garage Kerosene	kerosene	unknown		280	active	Located outside study area	N	3
B23	Mt. Carberry Landfill	diesel fuel	1/1/1989		1,000	active		N	3
B24	Wood Yard Scales #1	No. 2 fuel oil	1/1/1990		300	?		N	1,3
B25	Wood Yard Scales #2	No. 2 fuel oil	1/1/1990		300	?		N	1,3
B26	BWWTP	No. 2 fuel oil	1/1/1994		1,000	?		N	1,3
B27	#1 Turbine	lube oil	1/1/1957		450	active		Y	1,2,3
B28	#4 Turbine	lube oil	1/1/2026		450	active		Y	1,2,3
B29	#11 CRU ID Fan	lube oil	1/1/1993		250	active		N	2

TABLE 2 - PETROLEUM ABOVEGROUND STORAGE TANKS

Burgess Mill

Berlin, New Hampshire

Tank ID	Identity	Product Stored	Install Date	Removal Date	Capacity (gals.)	Status	Comments	Map	Sources
B30	#11 Dryer Bowser System	hydraulic oil	1/1/1966		2,000	active		Y	1,2,3
B31	Dominion Press	hydraulic oil	1/1/1980		600	active		Y	1,2,3
B32	Truck Dumper #2 Hydraulic Storage	hydraulic oil	unknown		500	active		Y	1,2,3
B33	Dryer Lube Oil Storage #1	lube oil	1/1/1994		550	active		Y	1,2,3
B34	Dryer Lube Oil Storage #2	lube oil	1/1/1994		550	active		Y	1,2,3
B35	Valmet Garage Lube #1	lube oil	1/1/1994		275	active		Y	1,2,3
B36	Valmet Garage Lube #2	lube oil	1/1/1994		275	active		Y	1,2,3
B38	Munce's Gasoline Tank	gasoline	1/1/1990		3,000	active		N	1,3
B37	Munce's Diesel Tank	diesel fuel	1/1/1990		2,000	active		N	1,3
	Former Bemco Area	unknown	unknown	unknown	?	not in use	Foundations from former AST located on southern side of Former Bemco Area.	Y	4
	4 Concrete Tank Foundations	unknown	unknown	unknown	?	not in use	Tank foundations identified on GZA Site Plan Figure No. 2 adjacent to Androscoggin River on eastern side north of railroad repair shop.	Y	4

SOURCES:

1. Report entitled "*Report on ASTM Phase I Environmental Site Assessment, Pulp and Paper of America Burgess Mill, Berlin, New Hampshire*," prepared by Haley & Aldrich, Inc. dated February 2002.
2. Letter to New Hampshire Department of Environmental Services Aboveground Storage Tank (AST) Compliance Bureau, prepared by Crown Vantage and dated October 30, 1998. Corrected Oil AST Registration forms for the Crown Vantage - Burgess Pulp Mill, in Berlin, New Hampshire, and the Crown Vantage - Cascade Paper Mill in Gorham, New Hampshire with attached figures depicting AST locations.
3. New Hampshire Department of Environmental Services website.
4. GZA plan entitled "*Phase 2 Hydrogeologic Investigation Burgess Mill Site Plan Burgess Mill,*" dated September 2003.

TABLE 3 - PETROLEUM ABOVEGROUND STORAGE TANKS

Cascade Mill
Gorham, New Hampshire

Tank ID Number	Identity	Capacity	Product Stored	Install Date	Status	Comments	Map	Sources
C01	#10 Paper Machine	25,000	#2 Fuel oil	Pre-1975	Removed/ August 2000	Tank was previously used to feed the air dryers on the #10 Tissue Machine. No leaks were detected during tank removal.	Y	1,2
C02	Cascade Boiler House	275	Kerosene	unknown	Active		Y	1,2
C03	Cascade Boiler House bulk Tank	150,000	#6 Oil	1987	Active		Y	1,2
C04	Cascade Boiler House Day Tank	15,000	#6 Oil	1987	Active		Y	1,2
C05	Boiler House Fuel Additive	400	Nalco Fuel Tech 72633 Fuel Additive	unknown	?		Y	1,2
C06	Cascade Maintenance garage	350	Diesel Fuel	1980s	Active		Y	1,2
C07	Cascade Waste Oil #1	275	Waste Oil	1990s	Active		Y	1,2
C08	Cascade Waste Oil #2	275	Waste Oil	1990s	Active		Y	1,2
C09	Cascade Waste Oil #3	275	Waste Oil	1990s	Active		Y	1,2
C10	Cascade Maintenance Garage Tank #2	275	Diesel Fuel	mid-1980s	Active		Y	1,2
C11	#7 Turbine	450	Lube Oil	1926	Active		Y	1,2
C12	#1 P.M. Bowser	2,750	Lube Oil	unknown	Active		Y	1,2
C13	#2 P.M. Bowser	1,500	Lube Oil	unknown	Active		Y	1,2
C14	#3 P.M. Bowser	440	Lube Oil	unknown	Active		Y	1,2
C15	#4 P.M. Bowser	450	Lube Oil	unknown	Active		Y	1,2
C16	#9 P.M. Bowser system	7,000	Lube Oil	unknown	Active		N	1,2
C17	#10 Bowser System	250			Removed 1996		N	1,2
C18	Cascade WWTP UST				Removed 1996		N	1,2
C19	#1 PM Calander Stack	220	Hydraulic Oil	unknown	Active		Y	1,2
C20	#2 PM Calander Stack	220	Hydraulic Oil	unknown	Active		Y	1,2
C21	#3 PM Calander Stack	220	Hydraulic Oil	unknown	Active		Y	1,2
C22	#3 PM 2nd Press Hydraulics	220	Hydraulic Oil	unknown	Active		Y	1,2
C23	#4 PM Calander Stack	220	Hydraulic Oil	unknown	Active		Y	1,2
C24	#4 PM 2nd Press Hydraulics	220	Hydraulic Oil	unknown	Active		Y	1,2
C25	Lift Station Emergency Generator	500	Diesel Fuel	1989	Active		Y	1,2
C26	Cascade WWTP Heating Oil	1,000	#2 Fuel Oil		?		N	1,2
C27	#2 PM 2nd Press hydraulic	75	Hydraulic Oil		?		N	1,2

TABLE 3 - PETROLEUM ABOVEGROUND STORAGE TANKS

Cascade Mill

Gorham, New Hampshire

Tank ID Number	Identity	Capacity	Product Stored	Install Date	Status	Comments	Map	Sources
C28	#1 PM Nipco Tri-Press hydraulics	330	Hydraulic Oil	1988	Active		Y	1,2
C29	Bowser Bulk Tank	5,000	Lube Oil	unknown	Active		Y	1,2
C30	#9 PM Blind Drill Press Loading	100	Hydraulic Oil	unknown	Active		Y	1,2
C31	#9 1st Press Loading	100	Hydraulic Oil	unknown	Active		Y	1,2
C32	#9 PM Yankee Suction Press Loading	100	Hydraulic Oil	unknown	Active		Y	1,2
C33	#9 PM Core Puller	100	Hydraulic Oil	unknown	Active		Y	1,2
C34	#9 PM Lifting Scoop	100	Hydraulic Oil	unknown	Active		Y	1,2
C35	#9 PM Jumbo Roll Elevator	100	Hydraulic Oil	unknown	Active		Y	1,2
C36	#9 PM Jumbo Roll Lowerator	100	Hydraulic Oil	unknown	Active		Y	1,2
C37		1,000	Lube Oil	unknown	?		N	1,2

SOURCES:

1. Report prepared by H&A entitled "*Report on ASTM Phase I Environmental Site Assessment, Pulp and Paper of America Cascade Mill, Gorham, New Hampshire* ," dated March 2002) dated March 4, 2002.
2. Letter to New Hampshire Department of Environmental Services Aboveground Storage Tank (AST) Compliance Bureau, prepared by Crown Vantage and dated October 30, 1998. Corrected Aboveground Oil Storage Tank Registration forms for the Crown Vantage - Burgess Pulp Mill, in Berlin, New Hampshire, and the Crown Vantage - Cascade Paper Mill in Gorham, New Hampshire with attached figures depicting AST locations.

TABLE 4 - SUMMARY OF PETROLEUM AND CHEMICAL SPILLS

Burgess Mill

Berlin, New Hampshire

Date	Amount	Substance	Discharge	Description	Map	Sources
PETROLEUM SPILLS						
11/20/1974	50 gallons	#6 fuel oil	river	A 40# steam line was used to flush a new oil line, the oil pump was started without closing the steam valve. The oil backed into the steam line and entered the condensate system.	N	1
8/14/1976	50 gallons	#6 fuel oil	river	A cracked nipple on a pump line allowed oil to leak.	N	1
7/21/1978	5 gallons	lube oil	river	Floor drain	N	1
01/29/79	200 gallons	#6 fuel oil	land	Occurred in area where storage tanks transformers take place.		1
11/03/80	unknown	#2 oil	land	Underground storage tank leak - minor	N	1
07/24/81	100 to 200 gallons	#6 fuel oil	land	Break in recirculation line that discharged into the floor drain that led to the waste water treatment facility.	N	1
08/07/81	1 gallon	#2 fuel oil	river	No other information was available for review.	N	1
07/20/82	3 to 5 gallons	gear oil	river	Oil leak from gear case into floor drain which discharged into the river.	N	1
09/30/82	1 gallon	lube oil	river	No other information was available for review.	N	1
10/13/82	1 gallon	lube oil	river	No other information was available for review.	N	1
01/05/83	100 to 200 gallons	diesel fuel	land	Fuel line break	N	1
04/18/84	400 gallons	oil	land	Leaking flange gasket from storage tank	N	1
08/25/86	unknown	unknown	land	Leaking tank. Tank was removed from main entrance way.	N	1
08/16/86	unknown	#2 fuel oil	river	No other information was available for review.	N	1
12/23/86	11,000 gallons	#6 fuel oil	land	Railroad tank car on tracks behind engineering building	N	1
01/10/87	600 to 1,000 gallons	#6 fuel oil	land	Overfill	N	1
04/29/87	3 gallons	lube oil	river	Broken oil line went to basement, some in sump and then discharged.	N	1
05/07/87	2 to 3 gallons	lube oil	river	Sump-pump down	N	1
11/13/88	5 to 10 gallons	lube oil	river	Power station. No other information was available.	N	1
08/10/88	5 gallons	lube oil	river	Machinery malfunction in main plant	N	1
06/20/88	7 gallons	#6 fuel oil	river	Thought to be leak in fuel line.	N	1
05/11/88	5 gallons	lube oil	river	No other information was available for review.	N	1
09/05/89	unknown	oil	river	Oil identified coming from drain pipe that runs into the River behind the Floc Plant.	N	4
08/24/89	50 gallons	#6 bunker Oil	land	Oil spilled onto the floor of the pump house near the rail side behind the engineering building.	N	4
12/10/90	<1 gallon	motor oil	river	Motor Oil spill into river. Bearing pack in turbine release.	N	1,4
02/09/90	small gallons	oil	river	No other information was available for review.	N	4
09/13/91	5 gallons	#2 heating oil	river	Spill was going over Cros power dam.	N	4
09/16/91	unknown	unknown	river	A sheen in the river was reported; source unknown.	N	1
12/01/92	unknown	oil	river	Floc Plant Area	N	2
12/14/92	<5 gallons	hydraulic oil	land	Oil was spilled at or near the lime kiln area.	Y	4
05/16/92	small amount	oil	land	Small spill at the #4 turbine; spill was non-reportable.	N	4
05/26/92	unknown	oil	river	No other information available.	N	2
04/19/92	unknown	oil	river	Possible oil spill in the river was reported to the Berlin Fire Department.	N	4
01/06/93	100 to 200 gallons	diesel fuel	land	Spill caused by fuel line break from tank.	N	1

TABLE 4 - SUMMARY OF PETROLEUM AND CHEMICAL SPILLS

Burgess Mill

Berlin, New Hampshire

Date	Amount	Substance	Discharge	Description	Map	Sources
PETROLEUM SPILLS						
01/07/93	30 gallons	hydraulic oil	land	Equipment failure-spill occurred in wood yard vicinity.	N	1,4
01/29/93	50 gallons	hydraulic oil	land	Ruptured hydraulic line	N	1
02/01/93	50 gallons	hydraulic oil	land	Near the truck dumpers	Y	4
03/15/93	50 gallons	#6 fuel oil	land	Spill during maintenance near pump house	Y	1,4
04/12/93	40 gallons	hydraulic oil	land	Broken hydraulic line on truck tipper	N	1
05/10/93	20 gallons	#6 fuel oil	land	Leak possibly coming from green storage tank on Main Street behind the engineering building.	Y	2,4
05/11/93	unknown	#6 fuel oil	land	Oil weeping out of bedrock retaining wall below pump house. Oil has not reached river.	N	1
05/26/93	unknown	oil	river	Oil sheen identified above and below the public Service Dam on Mason Street	N	4
10/27/93	5,000 gallons	#6 fuel oil	steam system	Spill occurred when oil was pumped through a steam system into an AST, overflowing the tank.	N	1
10/28/93	5 gallons	fuel oil	unknown	No other information available.	N	2
02/01/94	unknown	#6 fuel oil	land	Return line failure	N	1
02/04/94	unknown	#6 fuel oil	land	Oil tank leak contained in dike, will install a new return line and remove old.	N	4
06/24/94	<1 gallon	oil	water	Oil coming from Cross power #3 Turbine/hydro turbine reservoir leaked due to bearing failure.	N	1,4
07/27/94	2 gallons	#6 fuel oil	land	Spill in pen stock area	N	4
08/17/94	2 to 5 gallons	diesel fuel	land	Service garage	N	4
09/21/94	60 gallons	hydraulic oil	land	A hydraulic oil line burst at the chip dump.	N	4
09/22/94	50 gallons	hydraulic fluid	land	Spill due a piston break on their truck dumper.	Y	4
02/28/95	40 gallons	diesel fuel	land	Spill into wood chips	Y	1
05/17/95	20 gallons	oil/misc lubricant	land	14-inch sewer line leak	N	2
05/17/95	20 gallons	light oil or kerosene	river	Someone opened a drain valve discharge line.	N	1
06/01/95	25 gallons	diesel fuel	land	No other information was available for review.	N	1
10/09/96	3 to 4 gallons	diesel fuel	river	Backhoe fell off small barge and into the river.	N	1,4
06/19/97	unknown	#2 oil	land	No other information available.	N	1
09/08/97	50 gallons	#6 fuel oil	unknown	No other information available.	N	3
12/07/98	1 gallon	oil	land	Oil reported in the pits of both generators at the Riverside hydro Plant.	N	4
07/18/99	less than 1 pint	oil	river	Unpermitted discharge of oil to the river from the riverside hydrostation.	N	1
05/01/00	20 gallons	locomotive lubricant	land	Beyond Main Street, immediately north of downtown Berlin to railroad maintenance garage	N	1

TABLE 4 - SUMMARY OF PETROLEUM AND CHEMICAL SPILLS

Burgess Mill
Berlin, New Hampshire

Date	Amount	Substance	Discharge	Description	Map	Sources
CHEMICAL SPILLS						
1/31/1978	10 - 11,000 gallons	Sodium Chlorite	River	Spill occurred to a failure of the manhole cover on the fiberglass tank and spilled to the concrete dike surrounding the tank	N	1
4/12/1982	1,400 and 2,400 gallons	Sodium hydroxide	land	Leak developed at caustic unloading station.	N	1
2/14/1983	25 - 50 tons	Sodium Chlorite	land	"Quick connect" coupling had a leak-when an attempt was made to repair the leak; the coupling blew off.	N	1
5/27/1983	400 gallons	Sulfuric Acid	land	No other information was available for review.	N	1
07/13/88	small amount	Anhydrous Ammonia	land	Leak from flange gasket on-top of tank at the treatment plant.	N	4
09/21/88	small amount	PaperStock containing ClO2	land	Upper parking lot of the Burgess Mill	N	4
02/15/89	500 ml	Phenol Solution	?	No other information was available for review.	N	4
11/18/89	10 gallons	Sulfuric Acid	land	Burgess Central steam	N	4
09/12/89	3 pounds	Chlorine	land	Line containing chlorine had developed a small leak.	N	4
08/30/89	small amount	Anhydrous Ammonia	land	Small leak coming from ammonia tank at the Treatment Plant.	N	4
08/11/89	small amount	chlorine dioxide	?	No other information was available for review.	N	4
08/25/89	25 gallons	Sulfuric Acid	land	On the ground near a valve house in Burgess yard	N	4
06/15/89	unknown	Black liquor	land	A small pool was at the bottom of the excavation hole.	N	3,4
07/16/90	30 gallons	Caustic Soda	land	No other information was available for review.	N	4
09/26/90	2 gallons	Sulfuric Acid	land	No other information was available for review.	N	4
05/14/90	<50 gallons	Caustic Soda	land	Central Steam Area of TP-9 boiler.	N	4
02/01/90	unknown	Chlorine Dioxide	?	No other information was available for review.	N	4
03/19/90	50 gallons	Sulfuric Acid	land	Tank at the Kraft Area had been overfilled .	N	4
07/31/91	minor leak	Phosphoric Acid	?	Small leak in tank	N	4
01/04/91	100 gallons	Caustic Soda	land	Spill at the central steam area.	N	4
08/21/92	45 pounds	Chlorine	?	No other information was available for review	N	4
11/02/92	small amount	chlorine	?	Small admission of chlorine	N	4
12/15/93	1 to 2 gallons	hydrochloric acid	land	Burgess Central store unloading yard	N	1,4
08/10/93	unknown	chlorine	?	No other information was available for review.	N	4
07/16/93	6,154 pounds	Sulfuric Acid	land	Acid tank at the bleachery was overfilled and overflowed for approximately 5 minutes.	N	4
05/01/93	50 to 150 pounds	Chlorine	land	Released onto the roof of a building from which it ran down the side of the building and onto the ground. The chlorine eventually evaporated.	N	4
03/08/94	1,000 pounds	Caustic Soda	land	Spill from the storage tank behind the Alpha Plant Bleachery and began leaking inside the plant.	N	4
01/12/94	100 pounds	"Spent Acid"	land	Tank ruptured from ice that fell from building. Sulfuric acid is a component of "spent acid."	N	2,4
01/05/94	1,535 gallons	hydrogen peroxide 50%	land	Spill went into the containment dike around the tank.	N	4
03/09/94	4,900 pounds	Sodium hydroxide	land	Overflow of the sodium hydroxide storage tanks at the bleachery	N	4
06/19/95	5 gallons	sulfuric acid	land	spill of acid onto the ground and was washed into the waste process sewer	N	4
05/02/95	20 to 40 gallons	liquid Betz-CD308	land	Overfill of storage tank near lime kiln	N	4

TABLE 4 - SUMMARY OF PETROLEUM AND CHEMICAL SPILLS

Burgess Mill
Berlin, New Hampshire

Date	Amount	Substance	Discharge	Description	Map	Sources
CHEMICAL SPILLS						
06/22/95	1,000 gallons	Leachate	water	foreign material clogged the pipe. Leachate backed up and flowed out of the manhole	N	2
07/06/95	3,000 pounds	Sulfuric acid	?	No other information was available for review	N	2
12/16/97	15 gallons	Ammonia	land	Waste Treatment Plant developed a frozen line ands subsequent gasket rupture leaking of product into dike.	N	2,4
03/22/97	100 gallons	62% Phosphuric Acid	land	Spill of hazardous material pooled onto the frozen ground between the tanks and the secondary clarifier.	N	3
03/20/98	200 gallons	white liquor	land	During draw down of #4 Caustizer tank, release occurred through open manhole associated with #3 Caustier tank, within Lime Kiln Building. Tank #3 and #4 are connected by a common drain line.	N	4
08/19/98	2 gallons	Sulfuric Acid	water	Broken sewer line	N	2
09/10/98	unknown	Sulfuric Acid	land	A leak of sulfuric acid from a pinhole in a pipe on the top of the floor of the #1 ID fan building. The acid was washed of the floor and collected	N	3
10/07/98	unknown	Sodium hydroxide	land	overflow from a leaking sewer of high pH solution, partially from a joint on a PVC drain line which was pulled apart.	N	3
12/10/98	2,200 gallons	chlorine dioxide	land	mechanical failure - 2200 -gallons of liquid containing 170 lbs. Of ClO2 in solution.	N	4

SOURCES:

1. Report entitled "Report On, ASTM Phase I Environmental Site Assessment, Pulp And Paper Of America Burgess Mill, Berlin, New Hampshire," prepared by Haley & Aldrich, Inc. dated February 2002.
2. Draft report entitled "Preliminary Draft Limited Environmental Assessment Crown Vantage Pulp & Paper Mills Berlin and Gorham, New Hampshire" prepared by Tighe & Bond and dated April 1999.
3. New Hampshire Department of Environmental Services file review.
4. Copies of Berlin Fire Department Hazardous Spills, leaks and releases files obtained May 2, 2003.

TABLE 5 - SUMMARY OF SPILLS
Cascade Mill
Gorham, New Hampshire

Date	Amount	Substance	Discharge	Description	Map	Sources
3/12/1991	50 to 100 gallons	No. 6 fuel Oil	land	Expansion due to heat reportedly caused overflow from a railcar	Y	1
2/17/1996	50 to 70 gallons	No. 2 fuel oil	land	Hose damage by snow plow all on frozen ground.	Y	1
7/10/1996	10 pounds	25 % Sodium hydroxide	land	release occurred from valve that was on a "T" in the caustic fed line to the primary clarifier at the Cascade WWTP	N	2
2/13/200	100 gallons	No. 6 fuel oil	land	Release of oil from a section of underground piping in the vicinity of the bulk storage area	Y	1

SOURCES:
1. Report entitled "Report On, ASTM Phase I Environmental Site Assessment, Pulp And Paper Of America Cascade Mill, Gorham, New Hampshire," prepared by Haley & Aldrich, Inc. dated March 2002.
2. New Hampshire Department of Environmental Services file review.

TABLE 6 - NON-PETROLEUM STORAGE TANKS

Burgess Mill

Berlin, New Hampshire

Map ID	Product Stored	Hazardous Ingredient	Cercla RQ Lbs	Capacity (gals.)	Comments	Map	Source
1	Sulfuric Acid	H2SO4	1,000	27,700	Contained	Y	1
2	Caustic	NaOH	1,000	47,740 (2)	Water Solution	Y	1
3	Chlorate	NaClO3	N	38,300	Water Solution	Y	1
4	Oxygen	O2	N	11,000	Liquified Gas	Y	1
5	Chlorine Dioxide	ClO2	N	60,000 (2)	Water Solution	Y	1
6	Spent Acid	H2SO4	1,000	E 1,000 (2)	Water Solution	Y	1
7	Sulfur Dioxide	SO2	1	5,400	Liquified Gas	Y	1
8	Methanol	CH3OH	5,000	11,880	Contained	Y	1
9	Chlorine	CL2	10	10,000 Car (3)	Liquified Gas/Tank Cars	N	1
11	Sulfuric Acid	H2SO4	1,000	3,382		Y	1
12	Caustic	NaOH	1,000	4,603	Water Solution	Y	1
13	7D-24	VM&P NAPHTHA	1	5,000	Contains perchlor	Y	1
16	LPG	Pertol-Gas	N	18,000	Liquified Gas	Y	1
17	Caustic	NaOH	1,000	5,640	Water Solution	N	1
18	Sulfuric Acid	H2SO4	1,000	5,640	Water Solution	N	1
19	TRS Vapor	DMS	1	E 12,000	Pressurized Gas	N	1
20	Peroxide	H2O2	N	6,900	Water Solution	Y	1

Source & Notes:

1. Brown Company Berlin, NH "*Berlin Plants General Mill Layout*" dated May 5, 1974.
2. Map ID #s 1, 2, 3, 9, 10, 1, 12, 14, 15, 17, and 18 are stored in cars at locations throughout the mill.
3. N = None
4. E = Estimated

Table 7: Burgess Mill Groundwater Elevations

Location	*Date*	*Depth to Water*	*Groundwater Elevation (Ft, NGVD)*		
GZ-1				*Bottom Elevation :*	1021.2
	11/6/2003	6.9	1030.7		
	11/13/2003	6.7	1030.9		
GZ-2				*Bottom Elevation :*	1016.6
	11/6/2003	8.9	1029.1		
	11/13/2003	9.0	1028.9		
GZ-3				*Bottom Elevation :*	1037.9
	11/6/2003	9.9	1028.8		
	11/13/2003	8.9	1029.9		
GZ-4				*Bottom Elevation :*	1095.1
	11/6/2003	6.3	1102.2		
	11/13/2003	7.0	1101.5		
GZ-5				*Bottom Elevation :*	1070.3
	11/6/2003	4.2	1082.8		
	11/13/2003	4.3	1082.7		
GZ-6				*Bottom Elevation :*	1077.1
	11/6/2003	3.1	1082.8		
	11/13/2003	3.2	1082.7		
GZ-7				*Bottom Elevation :*	1081.0
	11/6/2003	1.8	1083.7		
	11/13/2003	1.9	1083.6		
GZ-8				*Bottom Elevation :*	1075.9
	11/6/2003	4.2	1083.6		
	11/13/2003	3.5	1084.2		

Location	Date	Depth to Water	Groundwater Elevation (Ft, NGVD)		
GZ-9				*Bottom Elevation :*	1083.6
	11/6/2003	1.7	1087.9		
	11/13/2003	1.6	1088.0		
GZ-10				*Bottom Elevation :*	1074.2
	11/6/2003	3.8	1083.3		
	11/13/2003	4.2	1082.9		
GZ-11				*Bottom Elevation :*	1071.3
	11/6/2003	7.3	1077.8		
	11/13/2003	6.7	1078.4		
GZ-12				*Bottom Elevation :*	1049.6
	11/6/2003	17.1	1056.3		
	11/13/2003	5.8	1067.6		
GZ-13				*Bottom Elevation :*	1050.9
	11/6/2003	6.6	1059.1		
	11/13/2003	17.2	1048.5		
GZ-14				*Bottom Elevation :*	1036.2
	11/6/2003	5.8	1047.9		
	11/13/2003	5.5	1048.2		
GZ-15				*Bottom Elevation :*	1018.0
	11/6/2003	24.5	1022.0		
	11/13/2003	24.3	1022.2		
GZ-16				*Bottom Elevation :*	1016.6
	11/6/2003	20.7	1019.8		
	11/13/2003	20.1	1020.4		
GZ-17				*Bottom Elevation :*	975.7
	11/6/2003	35.1	1015.8		
	11/13/2003	35.4	1015.5		

Location	*Date*	*Depth to Water*	*Groundwater Elevation (Ft, NGVD)*		
GZ-18				*Bottom Elevation :*	1015.1
	11/6/2003	32.5	1023.7		
	11/13/2003	33.0	1023.2		
GZ-20				*Bottom Elevation :*	1032.1
	11/6/2003	11.1	1034.7		
	11/13/2003	11.2	1034.6		
GZ-21				*Bottom Elevation :*	1059.7
	11/6/2003	3.2	1063.8		
	11/13/2003	2.5	1064.5		
GZ-22				*Bottom Elevation :*	1073.0
	11/6/2003	4.2	1075.9		
	11/13/2003	3.3	1076.8		
GZ-23				*Bottom Elevation :*	1049.5
	11/6/2003	6.8	1052.3		
	11/13/2003	7.0	1052.1		
GZ-24				*Bottom Elevation :*	1079.7
	11/6/2003	3.6	1083.0		
	11/13/2003	2.8	1083.8		
GZ-25				*Bottom Elevation :*	1075.9
	11/6/2003	6.4	1078.2		
	11/13/2003	6.7	1077.9		
GZ-26				*Bottom Elevation :*	1075.6
	11/6/2003	3.2	1079.9		
	11/13/2003	3.3	1079.8		
GZ-27				*Bottom Elevation :*	1081.9
	11/6/2003	2.7	1086.7		
	11/13/2003	2.7	1086.7		

Location	*Date*	*Depth to Water*	*Groundwater Elevation (Ft, NGVD)*

1. Depth-to-groundwater measurements made by GZA GeoEnvironmental, Inc. (GZA) personnel on the dates indicated.
2. The reference elevation for each well is the top of the PVC riser pipe.
3. Elevations are reported in feet and are based on an elevation survey conducted by GZA on November 6, 2003. The elevation for each well was measured using optical survey techniques and was referenced to an on-site benchmark of 1079.42 feet above mean sea level. The benchmark was located in the concrete footing of a metal support tower located approximately 100 feet northeast of GZ-21.

Table 8: Cascade Mill Groundwater Elevations

Location	Date	Depth to Water	Groundwater Elevation (Ft, NGVD)		
GZ-28				Bottom Elevation :	888.4
	11/5/2003	8.3	892.7		
	11/14/2003	7.6	893.4		
GZ-29				Bottom Elevation :	887.1
	11/5/2003	4.7	889.5		
	11/14/2003	2.6	891.6		
GZ-30				Bottom Elevation :	850.3
	11/5/2003	6.2	856.3		
	11/14/2003	6.3	856.2		
GZ-31				Bottom Elevation :	849.9
	11/5/2003	8.4	855.1		
	11/14/2003	7.7	855.8		
GZ-32				Bottom Elevation :	851.5
	11/5/2003	11.8	853.3		
	11/14/2003	11.0	854.2		
GZ-33				Bottom Elevation :	857.2
	11/5/2003	16.1	861.8		
	11/14/2003	16.0	861.8		
GZ-34				Bottom Elevation :	849.7
	11/5/2003	31.6	853.6		
	11/14/2003	31.8	853.4		
GZ-35				Bottom Elevation :	845.7
	11/5/2003	40.4	848.9		
	11/14/2003	41.5	847.8		

Location	*Date*	*Depth to Water*	*Groundwater Elevation (Ft, NGVD)*		
GZ-36				*Bottom Elevation :*	882.6
	11/5/2003	4.1	889.7		
	11/14/2003	4.7	889.2		

1. Depth-to-groundwater measurements made by GZA GeoEnvironmental, Inc. (GZA) personnel on the dates indicated.
2. The reference elevation for each well is the top of the PVC riser pipe.
3. Elevations are reported in feet and are based on an elevation survey conducted by GZA on November 5, 2003. The elevation for each well was measured using optical survey techniques and was referenced to an on-site benchmark of 863.50 feet above mean sea level located on the top of a manhole cover located adjacent to the Androscoggin River near the northernmost portion of the retaining wall.

Table 9: Burgess Mill Soil Results

Detects Only. Concentrations Exceeding S-1 Standard shown in Red.

Sample Location	*Parameter*	*Concentration (mg/kg)*	*Depth Interval*	*S-1 Standard (mg/kg)*
GZ-1				
October 14 2003				
	2-Methylnaphthalene	0.11	(5-7')	150
	Arsenic	4.9	(5-7')	11
	Barium	18	(5-7')	750
	Fluoranthene	0.15	(5-7')	810
	Fluorene	0.38	(5-7')	510
	Lead	140	(5-7')	400
	Mercury	0.3	(5-7')	13
	Pyrene	0.14	(5-7')	
	Selenium	1.2	(5-7')	260
GZ-7				
October 16 2003				
	2-Methylnaphthalene	0.07	(0-2')	150
	Acenaphthene	0.1	(0-2')	270
	Acenaphthylene	0.1	(0-2')	300
	Anthracene	0.52	(0-2')	1000
	Arsenic	7.1	(0-2')	11
	Barium	81	(0-2')	750
	Benzo[a]anthracene	7.5	(0-2')	0.7
	Benzo[a]pyrene	6.5	(0-2')	0.7
	Benzo[b]fluoranthene	12	(0-2')	7
	Benzo[g,h,i]perylene	1.4	(0-2')	

Sample Location	*Parameter*	*Concentration (mg/kg)*	*Depth Interval*	*S-1 Standard (mg/kg)*
	Benzo[k]fluoranthene	4.9	(0-2')	7
	Cadmium	1.4	(0-2')	32
	Chrysene	8.3	(0-2')	70
	Fluoranthene	9.6	(0-2')	810
	Fluorene	0.08	(0-2')	510
	Indeno[1,2,3-cd]pyrene	1.8	(0-2')	0.7
	Lead	150	(0-2')	400
	Mercury	18	(0-2')	13
	Naphthalene	0.07	(0-2')	5
	Phenanthrene	1.9	(0-2')	
	Pyrene	9.4	(0-2')	
	Selenium	2.9	(0-2')	260
GZ-20				
October 29 2003				
	Acenaphthene	0.07	5-7'	270
	Anthracene	0.14	5-7'	1000
	Benzo[a]anthracene	0.23	5-7'	0.7
	Benzo[a]pyrene	0.07	5-7'	0.7
	Benzo[b]fluoranthene	0.12	5-7'	7
	Benzo[k]fluoranthene	0.07	5-7'	7
	Chrysene	0.23	5-7'	70
	Fluoranthene	0.68	5-7'	810
	Fluorene	0.06	5-7'	510
	Naphthalene	2.8	5-7'	5

Sample Location	*Parameter*	*Concentration (mg/kg)*	*Depth Interval*	*S-1 Standard (mg/kg)*
	Phenanthrene	0.73	5-7'	
	Pyrene	0.57	5-7'	
SS-1				
	October 16 2003			
	2-Methylnaphthalene	27	(0-6")	150
	Ethylbenzene	0.6	(0-6")	140
	Fluorene	2	(0-6")	510
	iso-Propylbenzene	0.38	(0-6")	123
	Naphthalene	3	(0-6")	5
	Naphthalene	3.6	(0-6")	5
	Phenanthrene	2.4	(0-6")	
	Pyrene	0.8	(0-6")	
SS-5				
	October 16 2003			
	2-Methylnaphthalene	0.17	(0-6")	150
	Anthracene	0.05	(0-6")	1000
	Arsenic	27	(0-6")	11
	Barium	79	(0-6")	750
	Benzo[a]anthracene	0.12	(0-6")	0.7
	Benzo[a]pyrene	0.06	(0-6")	0.7
	Benzo[b]fluoranthene	0.27	(0-6")	7
	Benzo[k]fluoranthene	0.12	(0-6")	7
	Chrysene	0.43	(0-6")	70
	Fluoranthene	0.24	(0-6")	810
	Lead	16	(0-6")	400

Sample Location	*Parameter*	*Concentration (mg/kg)*	*Depth Interval*	*S-1 Standard (mg/kg)*
	Mercury	0.8	(0-6")	13
	Naphthalene	0.06	(0-6")	5
	Phenanthrene	0.14	(0-6")	
	Pyrene	0.19	(0-6")	
	Selenium	7.4	(0-6")	260
SS-8				
October 16 2003				
	Anthracene	0.09	(0-6")	1000
	Benzo[a]anthracene	0.52	(0-6")	0.7
	Benzo[a]pyrene	0.49	(0-6")	0.7
	Benzo[b]fluoranthene	0.95	(0-6")	7
	Benzo[g,h,i]perylene	0.15	(0-6")	
	Benzo[k]fluoranthene	0.51	(0-6")	7
	Chrysene	0.76	(0-6")	70
	Fluoranthene	0.63	(0-6")	810
	Indeno[1,2,3-cd]pyrene	0.16	(0-6")	0.7
	Phenanthrene	0.17	(0-6")	
	Pyrene	0.6	(0-6")	
SS-15				
October 16 2003				
	Acenaphthene	0.13	(0-6")	270
	Anthracene	0.32	(0-6")	1000
	Benzo[a]anthracene	1.3	(0-6")	0.7
	Benzo[a]pyrene	1.1	(0-6")	0.7
	Benzo[b]fluoranthene	1.6	(0-6")	7

Sample Location	*Parameter*	*Concentration (mg/kg)*	*Depth Interval*	*S-1 Standard (mg/kg)*
	Benzo[g,h,i]perylene	0.25	(0-6")	
	Benzo[k]fluoranthene	0.61	(0-6")	7
	Chrysene	1.4	(0-6")	70
	Fluoranthene	2.4	(0-6")	810
	Fluorene	0.11	(0-6")	510
	Indeno[1,2,3-cd]pyrene	0.3	(0-6")	0.7
	Phenanthrene	1.4	(0-6")	
	Pyrene	2.1	(0-6")	
SS-17				
October 17 2003				
	Fluoranthene	0.04	(0-6")	810
SS-18				
October 17 2003				
	Benzo[a]anthracene	0.11	(0-6")	0.7
	Benzo[a]pyrene	0.11	(0-6")	0.7
	Benzo[b]fluoranthene	0.15	(0-6")	7
	Benzo[g,h,i]perylene	0.07	(0-6")	
	Benzo[k]fluoranthene	0.06	(0-6")	7
	Chrysene	0.12	(0-6")	70
	Fluoranthene	0.18	(0-6")	810
	Phenanthrene	0.13	(0-6")	
	Pyrene	0.17	(0-6")	
SS-19				
October 20 2003				
	Naphthalene	2.7	(0-6")	5

Sample Location	*Parameter*	*Concentration (mg/kg)*	*Depth Interval*	*S-1 Standard (mg/kg)*
	Toluene	0.09	(0-6")	100
October 20 2003				
	2-Methylnaphthalene	33	(0-6")	150
	Acenaphthene	16	(0-6")	270
	Benzo[a]anthracene	26	(0-6")	0.7
	Benzo[a]pyrene	13	(0-6")	0.7
	Benzo[b]fluoranthene	8	(0-6")	7
	Benzo[g,h,i]perylene	5	(0-6")	
	Benzo[k]fluoranthene	3	(0-6")	7
	Chrysene	51	(0-6")	70
	Fluoranthene	19	(0-6")	810
	Fluorene	19	(0-6")	510
	Naphthalene	3	(0-6")	5
	Phenanthrene	68	(0-6")	
	Pyrene	77	(0-6")	
SS-20				
October 20 2003				
	Toluene	0.09	(0-6")	100
October 20 2003				
	2-Methylnaphthalene	0.09	(0-6")	150
	Benzo[a]anthracene	0.17	(0-6")	0.7
	Benzo[a]pyrene	0.15	(0-6")	0.7
	Benzo[b]fluoranthene	0.17	(0-6")	7
	Benzo[g,h,i]perylene	0.05	(0-6")	
	Benzo[k]fluoranthene	0.12	(0-6")	7

Sample Location	*Parameter*	*Concentration (mg/kg)*	*Depth Interval*	*S-1 Standard (mg/kg)*
	Chrysene	0.2	(0-6")	70
	Fluoranthene	0.31	(0-6")	810
	Fluorene	0.11	(0-6")	510
	Phenanthrene	0.23	(0-6")	
	Pyrene	0.35	(0-6")	
SS-21				
October 22 2003				
	Naphthalene	0.5	(0-6")	5
October 22 2003				
	2-Methylnaphthalene	0.9	(0-6")	150
	Acenaphthene	9.4	(0-6")	270
	Anthracene	42	(0-6")	1000
	Benzo[a]anthracene	110	(0-6")	0.7
	Benzo[a]pyrene	74	(0-6")	0.7
	Benzo[b]fluoranthene	92	(0-6")	7
	Benzo[g,h,i]perylene	35	(0-6")	
	Benzo[k]fluoranthene	38	(0-6")	7
	Chrysene	130	(0-6")	70
	Dibenz[a,h]anthracene	16	(0-6")	0.7
	Fluoranthene	210	(0-6")	810
	Fluorene	9.4	(0-6")	510
	Indeno[1,2,3-cd]pyrene	33	(0-6")	0.7
	Naphthalene	1.5	(0-6")	5
	Phenanthrene	130	(0-6")	

Sample Location	*Parameter*	*Concentration (mg/kg)*	*Depth Interval*	*S-1 Standard (mg/kg)*
	Pyrene	180	(0-6")	

1. Samples were collected by GZA GeoEnvironmental, Inc. (GZA) personnel. Refer to test boring logs, and chain-of-custody forms for sample collection dates.
2. Samples were analyzed by Eastern Analytical, Incorporated (EAI) of Concord, New Hampshire.
3. Results are in milligrams per kilogram.
3. S-1 indicates Method 1 Category S-1 Soil Standards established in the RCMP. RCMP indicates The New Hampshire Department of Environmental Services Contaminated Sites Risk Characterization and Management Policy" dated January 1998 with revised standards January 2001;
4. Red-boldface values indicate the detected concentration exceeds the NH S-1 Soil Standard for the respective compound.
5. Soil sample SS-11 is not shown on the table since no parameters at this sampling location were detected above laboratory detection limits
6. Refer to laboratory reports in Appendix D.

Table 10: Cascade Mill Soil Results

Detects Only. Concentrations Exceeding S-1 Standard shown in Red.

Sample Location	Parameter	Concentration (mg/kg)	Depth Interval	S-1 Standard (mg/kg)
GZ-32				
October 30 2003				
	Chloroform	1.3	5-7'	0.1
SS-26				
October 22 2003				
	Acenaphthene	1.3	(0-6")	270
	Benzo[a]anthracene	3.9	(0-6")	0.7
	Benzo[a]pyrene	3.1	(0-6")	0.7
	Benzo[b]fluoranthene	2.8	(0-6")	7
	Benzo[g,h,i]perylene	1.5	(0-6")	
	Benzo[k]fluoranthene	2	(0-6")	7
	Chrysene	6.8	(0-6")	70
	Fluoranthene	3.6	(0-6")	810
	Indeno[1,2,3-cd]pyrene	1.1	(0-6")	0.7
	Phenanthrene	2.2	(0-6")	
	Pyrene	9.5	(0-6")	
SS-27				
October 22 2003				
	2-Methylnaphthalene	0.05	(0-6")	150
	Acenaphthene	0.08	(0-6")	270
	Acenaphthylene	0.33	(0-6")	300
	Anthracene	0.41	(0-6")	1000
	Benzo[a]anthracene	1.1	(0-6")	0.7

Sample Location	*Parameter*	*Concentration (mg/kg)*	*Depth Interval*	*S-1 Standard (mg/kg)*
	Benzo[a]pyrene	1.1	(0-6")	0.7
	Benzo[b]fluoranthene	2	(0-6")	7
	Benzo[g,h,i]perylene	0.55	(0-6")	
	Benzo[k]fluoranthene	1	(0-6")	7
	Chrysene	1.5	(0-6")	70
	Fluoranthene	2.2	(0-6")	810
	Fluorene	0.11	(0-6")	510
	Indeno[1,2,3-cd]pyrene	0.58	(0-6")	0.7
	Naphthalene	0.07	(0-6")	5
	Phenanthrene	1.1	(0-6")	
	Pyrene	1.9	(0-6")	
SS-28				
October 22 2003				
	Benzo[a]anthracene	0.06	(0-6")	0.7
	Benzo[b]fluoranthene	0.07	(0-6")	7
	Benzo[k]fluoranthene	0.05	(0-6")	7
	Chrysene	0.07	(0-6")	70
	Fluoranthene	0.06	(0-6")	810
	Pyrene	0.06	(0-6")	
SS-29				
October 22 2003				
	Benzo[a]anthracene	0.11	(0-6")	0.7
	Benzo[a]pyrene	0.05	(0-6")	0.7
	Benzo[b]fluoranthene	0.07	(0-6")	7
	Benzo[k]fluoranthene	0.04	(0-6")	7

Sample Location	*Parameter*	*Concentration (mg/kg)*	*Depth Interval*	*S-1 Standard (mg/kg)*
	Chrysene	0.04	(0-6")	70
	Fluoranthene	0.08	(0-6")	810
	Pyrene	0.08	(0-6")	
SS-30				
	October 22 2003			
	Benzene	**0.6**	(0-6")	0.3
	Ethylbenzene	6.1	(0-6")	140
	iso-Propylbenzene	2.2	(0-6")	123
	Naphthalene	**14**	(0-6")	5
	Toluene	9.5	(0-6")	100
	October 22 2003			
	2-Methylnaphthalene	66	(0-6")	150
	Acenaphthene	5.5	(0-6")	270
	Fluoranthene	0.8	(0-6")	810
	Fluorene	9.4	(0-6")	510
	Naphthalene	**16**	(0-6")	5
	Phenanthrene	17	(0-6")	
	Pyrene	3.8	(0-6")	

1. Samples were collected by GZA GeoEnvironmental, Inc. (GZA) personnel. Refer to test boring logs, and chain-of-custody forms for sample collection dates.
2. Samples were analyzed by Eastern Analytical, Incorporated (EAI) of Concord, New Hampshire.
3. Results are in milligrams per kilogram.
3. S-1 indicates Method 1 Category S-1 Soil Standards established in the RCMP. RCMP indicates The New Hampshire Department of Environmental Services Contaminated Sites Risk Characterization and Management Policy" dated January 1998 with revised standards January 2001;
4. Red-boldface values indicate the detected concentration exceeds the NH S-1 Soil Standard for the respective compound.
5. Soil samples SS-23, SS-24, GZ-30, and GZ-31 are not shown on the table since no parameters at these sampling locations were detected above laboratory detection limits
6. Refer to laboratory reports in Appendix D.

Table 11: Burgess Mill Field Screening Results

Sample Location		*Standard*
GZ-1		
11/13/2003		
pH	8.4	*6.5 - 8.5*
Temperature (C)	15.4	*no standard*
Specific Conductance (uS/cm)	3840	*500 (mg/L)*
Dissolved Oxygen (mg/L)	0.94	*no standard*
Oxidation-Reduction Potential (mV)	-204	*no standard*
GZ-2		
11/13/2003		
pH	11	*6.5 - 8.5*
Temperature (C)	15	*no standard*
Specific Conductance (uS/cm)	8180	*500 (mg/L)*
Dissolved Oxygen (mg/L)	0.43	*no standard*
Oxidation-Reduction Potential (mV)	-220	*no standard*
GZ-3		
11/13/2003		
pH	6.3	*6.5 - 8.5*
Temperature (C)	12.1	*no standard*
Specific Conductance (uS/cm)	1363	*500 (mg/L)*
Dissolved Oxygen (mg/L)	2.47	*no standard*
Oxidation-Reduction Potential (mV)	52	*no standard*
GZ-4		
11/13/2003		
pH	6.3	*6.5 - 8.5*
Temperature (C)	9.9	*no standard*
Specific Conductance (uS/cm)	2210	*500 (mg/L)*
Dissolved Oxygen (mg/L)	2.39	*no standard*
Oxidation-Reduction Potential (mV)	-44	*no standard*

Sample Location		*Standard*
GZ-5		
11/13/2003		
pH	6.3	*6.5 - 8.5*
Temperature (C)	10.5	*no standard*
Specific Conductance (uS/cm)	671	*500 (mg/L)*
Dissolved Oxygen (mg/L)	2.22	*no standard*
Oxidation-Reduction Potential (mV)	114	*no standard*
GZ-6		
11/13/2003		
pH	6.4	*6.5 - 8.5*
Temperature (C)	10.7	*no standard*
Specific Conductance (uS/cm)	727	*500 (mg/L)*
Dissolved Oxygen (mg/L)	0.89	*no standard*
Oxidation-Reduction Potential (mV)	41	*no standard*
GZ-7		
11/13/2003		
pH	6.6	*6.5 - 8.5*
Temperature (C)	10.5	*no standard*
Specific Conductance (uS/cm)	626	*500 (mg/L)*
Dissolved Oxygen (mg/L)	2.69	*no standard*
Oxidation-Reduction Potential (mV)	84	*no standard*
GZ-8		
11/13/2003		
pH	6.7	*6.5 - 8.5*
Temperature (C)	9	*no standard*
Specific Conductance (uS/cm)	704	*500 (mg/L)*
Dissolved Oxygen (mg/L)	2.27	*no standard*
Oxidation-Reduction Potential (mV)	90	*no standard*

Sample Location		*Standard*
GZ-9		
11/13/2003		
pH	6.7	*6.5 - 8.5*
Temperature (C)	7.9	*no standard*
Specific Conductance (uS/cm)	835	*500 (mg/L)*
Dissolved Oxygen (mg/L)	1.32	*no standard*
Oxidation-Reduction Potential (mV)	57	*no standard*
GZ-10		
11/13/2003		
pH	5.9	*6.5 - 8.5*
Temperature (C)	10.3	*no standard*
Specific Conductance (uS/cm)	352	*500 (mg/L)*
Dissolved Oxygen (mg/L)	2.6	*no standard*
Oxidation-Reduction Potential (mV)	121	*no standard*
GZ-11		
11/13/2003		
pH	6.3	*6.5 - 8.5*
Temperature (C)	11.3	*no standard*
Specific Conductance (uS/cm)	414	*500 (mg/L)*
Dissolved Oxygen (mg/L)	5.32	*no standard*
Oxidation-Reduction Potential (mV)	91	*no standard*
GZ-12		
11/13/2003		
pH	6.4	*6.5 - 8.5*
Temperature (C)	12.3	*no standard*
Specific Conductance (uS/cm)	1596	*500 (mg/L)*
Dissolved Oxygen (mg/L)	1.96	*no standard*
Oxidation-Reduction Potential (mV)	16	*no standard*

Sample Location		*Standard*
GZ-13		
11/13/2003		
pH	7.2	*6.5 - 8.5*
Temperature (C)	10.3	*no standard*
Specific Conductance (uS/cm)	2930	*500 (mg/L)*
Dissolved Oxygen (mg/L)	2.18	*no standard*
Oxidation-Reduction Potential (mV)	79	*no standard*
GZ-14		
11/13/2003		
pH	6.6	*6.5 - 8.5*
Temperature (C)	13.9	*no standard*
Specific Conductance (uS/cm)	1169	*500 (mg/L)*
Dissolved Oxygen (mg/L)	2.76	*no standard*
Oxidation-Reduction Potential (mV)	113	*no standard*
GZ-15		
11/13/2003		
pH	6.8	*6.5 - 8.5*
Temperature (C)	10.8	*no standard*
Specific Conductance (uS/cm)	956	*500 (mg/L)*
Dissolved Oxygen (mg/L)	0.86	*no standard*
Oxidation-Reduction Potential (mV)	-46	*no standard*
GZ-16		
11/13/2003		
pH	6.5	*6.5 - 8.5*
Temperature (C)	6.3	*no standard*
Specific Conductance (uS/cm)	10	*500 (mg/L)*
Dissolved Oxygen (mg/L)	6.67	*no standard*
Oxidation-Reduction Potential (mV)	-3	*no standard*

Sample Location		*Standard*
GZ-17		
11/13/2003		
pH	6.6	*6.5 - 8.5*
Temperature (C)	12.3	*no standard*
Specific Conductance (uS/cm)	**4250**	*500 (mg/L)*
Dissolved Oxygen (mg/L)	2.43	*no standard*
Oxidation-Reduction Potential (mV)	-27	*no standard*
GZ-18		
11/13/2003		
pH	6.7	*6.5 - 8.5*
Temperature (C)	11.6	*no standard*
Specific Conductance (uS/cm)	**1385**	*500 (mg/L)*
Dissolved Oxygen (mg/L)	4.79	*no standard*
Oxidation-Reduction Potential (mV)	105	*no standard*
GZ-20		
11/13/2003		
pH	6.6	*6.5 - 8.5*
Temperature (C)	12.4	*no standard*
Specific Conductance (uS/cm)	**2630**	*500 (mg/L)*
Dissolved Oxygen (mg/L)	1.19	*no standard*
Oxidation-Reduction Potential (mV)	-77	*no standard*
GZ-21		
11/13/2003		
pH	**6.3**	*6.5 - 8.5*
Temperature (C)	14.5	*no standard*
Specific Conductance (uS/cm)	**1240**	*500 (mg/L)*
Dissolved Oxygen (mg/L)	1.03	*no standard*
Oxidation-Reduction Potential (mV)	14	*no standard*

Sample Location		*Standard*
GZ-22		
11/13/2003		
pH	6.7	*6.5 - 8.5*
Temperature (C)	22.5	*no standard*
Specific Conductance (uS/cm)	**1284**	*500 (mg/L)*
Dissolved Oxygen (mg/L)	1.01	*no standard*
Oxidation-Reduction Potential (mV)	14	*no standard*
GZ-23		
11/13/2003		
pH	6.6	*6.5 - 8.5*
Temperature (C)	8.9	*no standard*
Specific Conductance (uS/cm)	**1551**	*500 (mg/L)*
Dissolved Oxygen (mg/L)	2.39	*no standard*
Oxidation-Reduction Potential (mV)	-34	*no standard*
GZ-24		
11/14/2003		
pH	**9.6**	*6.5 - 8.5*
Temperature (C)	6.9	*no standard*
Specific Conductance (uS/cm)	398	*500 (mg/L)*
Dissolved Oxygen (mg/L)	2.25	*no standard*
Oxidation-Reduction Potential (mV)	82	*no standard*
GZ-25		
11/14/2003		
pH	6.6	*6.5 - 8.5*
Temperature (C)	9.3	*no standard*
Specific Conductance (uS/cm)	338	*500 (mg/L)*
Dissolved Oxygen (mg/L)	0.52	*no standard*
Oxidation-Reduction Potential (mV)	80	*no standard*

Sample Location		*Standard*
GZ-26		
11/14/2003		
pH	6.9	*6.5 - 8.5*
Temperature (C)	6.4	*no standard*
Specific Conductance (uS/cm)	**1584**	*500 (mg/L)*
Dissolved Oxygen (mg/L)	2.94	*no standard*
Oxidation-Reduction Potential (mV)	154	*no standard*
GZ-27		
11/14/2003		
pH	**6.1**	*6.5 - 8.5*
Temperature (C)	8.2	*no standard*
Specific Conductance (uS/cm)	338	*500 (mg/L)*
Dissolved Oxygen (mg/L)	2.8	*no standard*
Oxidation-Reduction Potential (mV)	93	*no standard*

1. Samples collected by GZA GeoEnvironmental, Inc. (GZA) personnel on the date indicated.
2. *u*S/cm indicates microsiemens per centimeter; ^{0}C indicates degrees centigrade; mg/L indicates milligrams per liter; mV indicates millivolts.
3. SMCL indicates Secondary Maximum Contaminant Levels, which are enforceable aesthetics-based criteria for public water supplies.
4. Standard for total dissolved solids in mg/L, which is generally equivalent to specific conductance in uS/cm multiplied by 0.55 to 0.75.
5. Specific conductance values greater than 909 *u*S/cm are assumed to exceed the standard for total dissolved solids.
6. Red-boldface indicates that the measured level exceeds its Secondary Maximum Contaminant Level.
3. ORP values shown are positive unless preceded by a negative sign.

Table 12: Burgess Mill Groundwater Results

Detects Only. Concentrations Exceeding GW-1 Standard shown in Red.

Sample Location	*Parameter*	*Concentration (ug/l)*	*Primary (P) or Duplicate (Dup)*	*GW-1 Standard (ug/l)*
GZ-4				
November 13 2003				
	2-Methylnaphthalene	0.2	P	280
	Acenaphthene	2.4	P	420
	Anthracene	0.6	P	2100
	Arsenic	6	P	10
	Barium	670	P	2000
	Benzo[a]pyrene	0.2	P	10
	Benzo[b]fluoranthene	0.2	P	10
	Benzo[g,h,i]perylene	0.1	P	210
	Benzo[k]fluoranthene	0.2	P	10
	Chrysene	0.2	P	10
	Fluoranthene	0.9	P	280
	Fluorene	1.8	P	280
	Naphthalene	1.8	P	20
	Phenanthrene	0.8	P	210
	Pyrene	0.8	P	210
	Sulfate	5000	P	500000
GZ-5				
November 13 2003				
	Acenaphthene	2	P	420
	Anthracene	0.5	P	2100
	Arsenic	33	P	10
	Arsenic	33	Dup 7	10
	Barium	110	P	2000

Sample Location	*Parameter*	*Concentration (ug/l)*	*Primary (P) or Duplicate (Dup)*	*GW-1 Standard (ug/l)*
	Barium	100	Dup 7	2000
	Benzo[a]anthracene	0.4	P	10
	Benzo[a]pyrene	0.3	P	10
	Benzo[b]fluoranthene	0.3	P	10
	Benzo[g,h,i]perylene	0.2	P	210
	Benzo[k]fluoranthene	0.3	P	10
	Chrysene	0.4	P	10
	Fluoranthene	1.3	P	280
	Fluorene	0.2	P	280
	Indeno[1,2,3-cd]pyrene	0.2	P	10
	Phenanthrene	0.2	P	210
	Pyrene	1.1	P	210
GZ-6				
November 13 2003				
	Anthracene	6	P	2100
	Arsenic	8	P	10
	Barium	52	P	2000
	Benzo[a]anthracene	**120**	P	10
	Benzo[a]pyrene	**120**	P	10
	Benzo[b]fluoranthene	**160**	P	10
	Benzo[g,h,i]perylene	86	P	210
	Benzo[k]fluoranthene	**99**	P	10
	Chrysene	**160**	P	10
	Fluoranthene	130	P	280
	Indeno[1,2,3-cd]pyrene	**99**	P	10
	Lead	1	P	15
	Phenanthrene	23	P	210

Sample Location	Parameter	Concentration (ug/l)	Primary (P) or Duplicate (Dup)	GW-1 Standard (ug/l)
	Pyrene	120	P	210
	Toluene	7	P	1000
GZ-7				
November 13 2003				
	2-Methylnaphthalene	0.9	P	280
	Acenaphthene	1.9	P	420
	Acenaphthylene	0.7	P	420
	Anthracene	7.9	P	2100
	Benzo[a]anthracene	83	P	10
	Benzo[a]pyrene	79	P	10
	Benzo[b]fluoranthene	91	P	10
	Benzo[g,h,i]perylene	36	P	210
	Benzo[k]fluoranthene	49	P	10
	Chrysene	97	P	10
	Dibenz[a,h]anthracene	20	P	10
	Fluoranthene	98	P	280
	Fluorene	1.2	P	280
	Indeno[1,2,3-cd]pyrene	45	P	10
	Naphthalene	0.9	P	20
	Phenanthrene	29	P	210
	Pyrene	100	P	210
GZ-8				
November 13 2003				
	2-Methylnaphthalene	0.2	P	280
	Acenaphthene	1.9	P	420
	Acenaphthylene	0.2	P	420
	Anthracene	1.8	P	2100

Sample Location	*Parameter*	*Concentration (ug/l)*	*Primary (P) or Duplicate (Dup)*	*GW-1 Standard (ug/l)*
	Benzo[a]anthracene	4.6	P	10
	Benzo[a]pyrene	4.6	P	10
	Benzo[b]fluoranthene	4.2	P	10
	Benzo[g,h,i]perylene	2.8	P	210
	Benzo[k]fluoranthene	4.2	P	10
	Chrysene	5.5	P	10
	Dibenz[a,h]anthracene	1.4	P	10
	Fluoranthene	8.1	P	280
	Fluorene	2.2	P	280
	Indeno[1,2,3-cd]pyrene	2.9	P	10
	Naphthalene	1.6	P	20
	Phenanthrene	1.9	P	210
	Pyrene	7.3	P	210
GZ-9				
November 13 2003				
	Acenaphthene	1.1	P	420
	Acenaphthylene	0.1	P	420
	Anthracene	0.9	P	2100
	Arsenic	1	P	10
	Barium	150	P	2000
	Benzo[a]anthracene	6.1	P	10
	Benzo[a]pyrene	5.9	P	10
	Benzo[b]fluoranthene	6.8	P	10
	Benzo[g,h,i]perylene	3.7	P	210
	Benzo[k]fluoranthene	4	P	10
	Chrysene	6.5	P	10
	Dibenz[a,h]anthracene	1.8	P	10

Sample Location	*Parameter*	*Concentration (ug/l)*	*Primary (P) or Duplicate (Dup)*	*GW-1 Standard (ug/l)*
	Fluoranthene	6.8	P	280
	Fluorene	0.2	P	280
	Indeno[1,2,3-cd]pyrene	4	P	10
	Naphthalene	0.1	P	20
	Phenanthrene	1.8	P	210
	Pyrene	7	P	210
GZ-10				
November 13 2003				
	Arsenic	2	P	10
	Barium	54	P	2000
	Chromium	13	P	100
GZ-11				
November 13 2003				
	Barium	110	P	2000
GZ-12				
November 13 2003				
	1,1,1-Trichloroethane	**610**	P	200
	1,1-Dichloroethane	75	P	81
	1,1-Dichloroethene	**16**	P	7
	1,2,4-Trichlorobenzene	50	P	70
	1,2-Dichlorobenzene	2	P	600
	1,3-Dichlorobenzene	9	P	600
	1,4-Dichlorobenzene	12	P	75
	Chlorobenzene	3	P	100
	Trichloroethene	4	P	5
GZ-13				
November 13 2003				

Sample Location	*Parameter*	*Concentration (ug/l)*	*Primary (P) or Duplicate (Dup)*	*GW-1 Standard (ug/l)*
	1,2,4-Trichlorobenzene	3	P	70
	1,3-Dichlorobenzene	1	P	600
	1,4-Dichlorobenzene	1	P	75
GZ-15				
November 13 2003				
	Acetone	10	P	700
	Arsenic	12	P	10
	Barium	200	P	2000
	Chromium	12	P	100
	Lead	25	P	15
November 13 2003				
	Sulfate	130000	P	500000
GZ-16				
November 13 2003				
	Arsenic	1	P	10
	Barium	40	P	2000
	Lead	17	P	15
	Sulfate	16000	P	500000
GZ-17				
November 13 2003				
	Arsenic	1	P	10
	Barium	77	P	2000
	Selenium	2	P	50
November 13 2003				
	Sulfate	100000	P	500000
	Sulfate	100000	Dup 9	500000
GZ-18				

Sample Location	Parameter	Concentration (ug/l)	Primary (P) or Duplicate (Dup)	GW-1 Standard (ug/l)
	November 13 2003			
	Benzo[b]fluoranthene	0.1	P	10
	Chrysene	0.1	P	10
	Fluoranthene	0.2	P	280
	Pyrene	0.3	P	210
	November 13 2003			
	Sulfate	190000	P	500000
GZ-20				
	November 13 2003			
	2-Methylnaphthalene	15	P	280
	2-Methylnaphthalene	35	Dup 5	280
	Acenaphthene	16	P	420
	Acenaphthene	27	Dup 5	420
	Acenaphthylene	9	Dup 5	420
	Anthracene	33	P	2100
	Anthracene	53	Dup 5	2100
	Arsenic	33	P	10
	Barium	140	P	2000
	Benzo[a]anthracene	56	P	10
	Benzo[a]anthracene	110	Dup 5	10
	Benzo[a]pyrene	50	P	10
	Benzo[a]pyrene	88	Dup 5	10
	Benzo[b]fluoranthene	50	P	10
	Benzo[b]fluoranthene	97	Dup 5	10
	Benzo[g,h,i]perylene	23	P	210
	Benzo[g,h,i]perylene	65	Dup 5	210
	Benzo[k]fluoranthene	50	P	10

Sample Location	*Parameter*	*Concentration (ug/l)*	*Primary (P) or Duplicate (Dup)*	*GW-1 Standard (ug/l)*
	Benzo[k]fluoranthene	74	Dup 5	10
	Chrysene	69	P	10
	Chrysene	120	Dup 5	10
	Fluoranthene	110	P	280
	Fluoranthene	200	Dup 5	280
	Fluorene	23	P	280
	Fluorene	35	Dup 5	280
	Indeno[1,2,3-cd]pyrene	31	P	10
	Indeno[1,2,3-cd]pyrene	60	Dup 5	10
	Lead	5	P	15
	Naphthalene	17	P	20
	Naphthalene	31	Dup 5	20
	Phenanthrene	79	P	210
	Phenanthrene	150	Dup 5	210
	Pyrene	140	P	210
	Pyrene	230	Dup 5	210
	Selenium	1	P	50
GZ-22				
November 14 2003				
	Arsenic	20	Dup 8	10
	Arsenic	21	P	10
	Barium	190	Dup 8	2000
	Barium	190	P	2000
	Mercury	0.1	Dup 8	2
	Selenium	2	P	50
	Selenium	1	Dup 8	50
GZ-24				

Sample Location	Parameter	Concentration (ug/l)	Primary (P) or Duplicate (Dup)	GW-1 Standard (ug/l)
November 14 2003				
	2-Methylnaphthalene	0.3	P	280
	Acenaphthene	0.6	P	420
	Acetone	30	P	700
	Anthracene	0.6	P	2100
	Arsenic	4	P	10
	Barium	22	P	2000
	Benzo[a]anthracene	1.7	P	10
	Benzo[a]pyrene	2	P	10
	Benzo[b]fluoranthene	2	P	10
	Benzo[g,h,i]perylene	1.5	P	210
	Benzo[k]fluoranthene	1.5	P	10
	Chrysene	2	P	10
	Fluoranthene	2.6	P	280
	Fluorene	0.5	P	280
	Indeno[1,2,3-cd]pyrene	1.3	P	10
	Naphthalene	0.8	P	20
	Phenanthrene	2.2	P	210
	Pyrene	2.5	P	210
	Selenium	1	P	50
GZ-25				
November 14 2003				
	1,1-Dichloroethane	3	P	81
	2-Methylnaphthalene	150	P	280
	Acenaphthene	**640**	P	420
	Anthracene	1600	P	2100
	Benzo[a]anthracene	**3400**	P	10

Sample Location	*Parameter*	*Concentration (ug/l)*	*Primary (P) or Duplicate (Dup)*	*GW-1 Standard (ug/l)*
	Benzo[a]pyrene	2300	P	10
	Benzo[b]fluoranthene	2400	P	10
	Benzo[g,h,i]perylene	1000	P	210
	Benzo[k]fluoranthene	1600	P	10
	Chrysene	3600	P	10
	Dibenz[a,h]anthracene	490	P	10
	Fluoranthene	6500	P	280
	Fluorene	580	P	280
	Indeno[1,2,3-cd]pyrene	1000	P	10
	Naphthalene	120	P	20
	Phenanthrene	4400	P	210
	Pyrene	6100	P	210
	Toluene	1	P	1000
GZ-26				
November 14 2003				
	Acenaphthene	3	P	420
	Anthracene	1.7	P	2100
	Arsenic	3	P	10
	Barium	72	P	2000
	Benzo[a]anthracene	2.2	P	10
	Benzo[a]pyrene	1.8	P	10
	Benzo[b]fluoranthene	2.5	P	10
	Benzo[g,h,i]perylene	1.4	P	210
	Benzo[k]fluoranthene	1.5	P	10
	Chrysene	2.9	P	10
	Fluoranthene	5.9	P	280
	Fluorene	0.3	P	280

Sample Location	*Parameter*	*Concentration (ug/l)*	*Primary (P) or Duplicate (Dup)*	*GW-1 Standard (ug/l)*
	Indeno[1,2,3-cd]pyrene	1.4	P	10
	Phenanthrene	2.5	P	210
	Pyrene	6.4	P	210
GZ-27				
November 14 2003				
	2-Methylnaphthalene	0.4	P	280
	Acenaphthene	1.9	P	420
	Acenaphthylene	0.3	P	420
	Anthracene	4.4	P	2100
	Benzo[a]anthracene	**13**	P	10
	Benzo[a]pyrene	**11**	P	10
	Benzo[b]fluoranthene	9.2	P	10
	Benzo[g,h,i]perylene	4.9	P	210
	Benzo[k]fluoranthene	7.4	P	10
	Chrysene	**15**	P	10
	Dibenz[a,h]anthracene	2.7	P	10
	Fluoranthene	17	P	280
	Fluorene	1.7	P	280
	Indeno[1,2,3-cd]pyrene	5.4	P	10
	Naphthalene	0.3	P	20
	Phenanthrene	17	P	210
	Pyrene	24	P	210

1. Samples were collected by GZA GeoEnvironmental, Inc. on the dates indicated.
2. ug/L indicates micrograms per liter; data are in ug/L.
3. NH GW-1 indicates New Hampshire Ambient Groundwater Quality Standards (AGQS) as established in New Hampshire Code of Administrative Rules Env-Wm 1403.05.
4. Red-boldface values indicate exceedances of respective NH AGQS.
5. Groundwater samples collected for metals analyses were field filtered and data shown hereon represent dissolved metals concentrations.
6. Groundwater samples GZ-1, GZ-2, GZ-3, GZ-14, GZ-19, GZ-21, and GZ-23 are not shown on this table since no parameters were detected above laboratory detection limits.
7. Refer to Appendix E for laboratory reports.

Table 13: Cascade Mill Field Screening Results

Sample Location		*Standard*
GZ-28		
11/14/2003		
pH	6.6	*6.5 - 8.5*
Temperature (C)	7.2	*no standard*
Specific Conductance (uS/cm)	26	*500 (mg/L)*
Dissolved Oxygen (mg/L)	1.78	*no standard*
Oxidation-Reduction Potential (mV)	123	*no standard*
GZ-29		
11/14/2003		
pH	11	*6.5 - 8.5*
Temperature (C)	8.9	*no standard*
Specific Conductance (uS/cm)	257	*500 (mg/L)*
Dissolved Oxygen (mg/L)	6.95	*no standard*
Oxidation-Reduction Potential (mV)	102	*no standard*
GZ-30		
11/14/2003		
pH	8.8	*6.5 - 8.5*
Temperature (C)	11.5	*no standard*
Specific Conductance (uS/cm)	283	*500 (mg/L)*
Dissolved Oxygen (mg/L)	0.34	*no standard*
Oxidation-Reduction Potential (mV)	0	*no standard*
GZ-31		
11/14/2003		
pH	6.7	*6.5 - 8.5*
Temperature (C)	10.6	*no standard*
Specific Conductance (uS/cm)	452	*500 (mg/L)*
Dissolved Oxygen (mg/L)	0.84	*no standard*
Oxidation-Reduction Potential (mV)	83	*no standard*

Sample Location		*Standard*
GZ-32		
11/14/2003		
pH	6.5	*6.5 - 8.5*
Temperature (C)	8.1	*no standard*
Specific Conductance (uS/cm)	164	*500 (mg/L)*
Dissolved Oxygen (mg/L)	2.56	*no standard*
Oxidation-Reduction Potential (mV)	182	*no standard*
GZ-33		
11/14/2003		
pH	5.5	*6.5 - 8.5*
Temperature (C)	10.6	*no standard*
Specific Conductance (uS/cm)	111	*500 (mg/L)*
Dissolved Oxygen (mg/L)	8.02	*no standard*
Oxidation-Reduction Potential (mV)	132	*no standard*
GZ-34		
11/14/2003		
pH	4.6	*6.5 - 8.5*
Temperature (C)	8.8	*no standard*
Specific Conductance (uS/cm)	16	*500 (mg/L)*
Dissolved Oxygen (mg/L)	6.94	*no standard*
Oxidation-Reduction Potential (mV)	77	*no standard*
GZ-35		
11/14/2003		
pH	6.6	*6.5 - 8.5*
Temperature (C)	6.3	*no standard*
Specific Conductance (uS/cm)	25	*500 (mg/L)*
Dissolved Oxygen (mg/L)	5.03	*no standard*
Oxidation-Reduction Potential (mV)	74	*no standard*

Sample Location		*Standard*
GZ-36		
11/14/2003		
pH	9.3	*6.5 - 8.5*
Temperature (C)	8.5	*no standard*
Specific Conductance (uS/cm)	382	*500 (mg/L)*
Dissolved Oxygen (mg/L)	4.93	*no standard*
Oxidation-Reduction Potential (mV)	109	*no standard*

1. Samples collected by GZA GeoEnvironmental, Inc. (GZA) personnel on the date indicated.
2. uS/cm indicates microsiemens per centimeter; ^{0}C indicates degrees centigrade; mg/L indicates milligrams per liter; mV indicates millivolts.
3. SMCL indicates Secondary Maximum Contaminant Levels, which are enforceable aesthetics-based criteria for public water supplies.
4. Standard for total dissolved solids in mg/L, which is generally equivalent to specific conductance in uS/cm multiplied by 0.55 to 0.75.
5. Specific conductance values greater than 909 *u*S/cm are assumed to exceed the standard for total dissolved solids.
6. Red-boldface indicates that the measured level exceeds its Secondary Maximum Contaminant Level.
3. ORP values shown are positive unless preceded by a negative sign.

Table 14: Cascade Mill Groundwater Results

Detects Only. Concentrations Exceeding GW-1 Standard shown in Red.

Sample Location	*Parameter*	*Concentration (ug/l)*	*Primary (P) or Duplicate (Dup)*	*GW-1 Standard (ug/l)*
GZ-28				
	November 14 2003			
	Arsenic	6	P	10
	Barium	37	P	2000
	Selenium	1	P	50
	Sulfate	17000	P	500000
GZ-29				
	November 14 2003			
	Acetone	20	P	700
	Arsenic	2	P	10
	Barium	6	P	2000
	Chromium	1	P	100
	Sulfate	27000	P	500000
GZ-30				
	November 14 2003			
	Sulfate	32000	P	500000
GZ-31				
	November 14 2003			
	2-Methylnaphthalene	**320**	P	280
	Acenaphthene	**910**	P	420
	Acenaphthylene	70	P	420
	Anthracene	**2600**	P	2100
	Benzo[a]anthracene	**4300**	P	10
	Benzo[a]pyrene	**3400**	P	10
	Benzo[b]fluoranthene	**3400**	P	10

Sample Location	*Parameter*	*Concentration (ug/l)*	*Primary (P) or Duplicate (Dup)*	*GW-1 Standard (ug/l)*
	Benzo[g,h,i]perylene	1600	P	210
	Benzo[k]fluoranthene	2600	P	10
	Chrysene	4100	P	10
	Dibenz[a,h]anthracene	780	P	10
	Fluoranthene	8300	P	280
	Fluorene	1300	P	280
	Indeno[1,2,3-cd]pyrene	1800	P	10
	Naphthalene	37	P	20
	Naphthalene	590	P	20
	Phenanthrene	8000	P	210
	Pyrene	8100	P	210
GZ-32				
November 14 2003				
	1,4-Dichlorobenzene	1	P	75
	Carbon disulfide	7	P	70
GZ-33				
November 14 2003				
	2-Methylnaphthalene	0.6	P	280
	Barium	42	P	2000
	Benzo[a]anthracene	0.2	P	10
	Chrysene	0.1	P	10
	Fluoranthene	0.2	P	280
	Naphthalene	0.9	P	20
	Phenanthrene	0.4	P	210
	Pyrene	0.2	P	210
	Selenium	1	P	50
November 14 2003				

Sample Location	*Parameter*	*Concentration (ug/l)*	*Primary (P) or Duplicate (Dup)*	*GW-1 Standard (ug/l)*
	Sulfate	120000	P	500000
GZ-36				
November 14 2003				
	2-Methylnaphthalene	1.5	P	280
	2-Methylnaphthalene	5	Dup 6	280
	Acenaphthene	62	Dup 6	420
	Acenaphthene	17	P	420
	Acetone	10	P	700
	Anthracene	140	Dup 6	2100
	Anthracene	35	P	2100
	Benzo[a]anthracene	**120**	Dup 6	10
	Benzo[a]anthracene	**24**	P	10
	Benzo[a]pyrene	**65**	Dup 6	10
	Benzo[a]pyrene	**12**	P	10
	Benzo[b]fluoranthene	**63**	Dup 6	10
	Benzo[b]fluoranthene	**15**	P	10
	Benzo[g,h,i]perylene	24	Dup 6	210
	Benzo[g,h,i]perylene	5.5	P	210
	Benzo[k]fluoranthene	**66**	Dup 6	10
	Benzo[k]fluoranthene	9.2	P	10
	Chrysene	**33**	P	10
	Chrysene	**150**	Dup 6	10
	Dibenz[a,h]anthracene	**14**	Dup 6	10
	Dibenz[a,h]anthracene	3.5	P	10
	Fluoranthene	**310**	Dup 6	280
	Fluoranthene	80	P	280
	Fluorene	24	P	280

Sample Location	*Parameter*	*Concentration (ug/l)*	*Primary (P) or Duplicate (Dup)*	*GW-1 Standard (ug/l)*
	Fluorene	88	Dup 6	280
	Indeno[1,2,3-cd]pyrene	6.1	P	10
	Indeno[1,2,3-cd]pyrene	**28**	Dup 6	10
	Naphthalene	2.2	P	20
	Naphthalene	5	Dup 6	20
	Phenanthrene	**410**	Dup 6	210
	Phenanthrene	110	P	210
	Pyrene	**320**	Dup 6	210
	Pyrene	69	P	210

1. Samples were collected by GZA GeoEnvironmental, Inc. on the dates indicated.
2. *ug*/L indicates micrograms per liter; data are in *ug*/L.
3. NH GW-1 indicates New Hampshire Ambient Groundwater Quality Standards (AGQS) as established in New Hampshire Code of Administrative Rules Env-Wm 1403.05.
4. Red-boldface values indicate exceedances of respective NH AGQS.
5. Groundwater samples collected for metals analyses were field filtered and data shown hereon represent dissolved metals concentrations.
6. Groundwater samples GZ-34 and GZ-35 are not shown on this table since no parameters were detected above laboratory detection limits.
7. Refer to Appendix E for laboratory reports.

APPENDIX A

LIMITATIONS

GEOHYDROLOGICAL LIMITATIONS

1. The conclusions and recommendations submitted in this report are based in part upon the data obtained from a limited number of soil samples from widely spaced subsurface explorations. The nature and extent of variations between these explorations may not become evident until further investigation. If variations or other latent conditions then appear evident, it will be necessary to reevaluate the recommendations of this report.

2. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretations of widely spaced explorations and samples; actual soil transitions are probably more gradual. For specific information, refer to the boring logs.

3. Water level readings have been made in the test pits, borings and/or observation wells at times and under conditions stated on the exploration logs. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall and other factors different from those prevailing at the time measurements were made.

4. Except as noted within the text of the report, no quantitative laboratory testing was performed as part of the site assessment. Where such analyses have been conducted by an outside laboratory, GZA GeoEnvironmental, Inc. (GZA) has relied upon the data provided, and has not conducted an independent evaluation of the reliability of these data.

5. The conclusions and recommendations contained in this report are based in part upon various types of chemical data and are contingent upon their validity. These data have been reviewed and interpretations made in the report. As indicated within the report, some of these data are preliminary "screening" level data, and should be confirmed with quantitative analyses if more specific information is necessary. Moreover, it should be noted that variations in the types and concentrations of contaminants and variations in their flow paths may occur due to seasonal water table fluctuations, past disposal practices, the passage of time, and other factors. Should additional chemical data become available in the future, these data should be reviewed by GZA, and the conclusions and recommendations presented therein modified accordingly.

6. Chemical analyses have been performed for specific parameters during the course of this study, as detailed in the text. It must be noted that additional constituents not searched for during the current study may be present in soil and groundwater at the site.

7. It is recommended that this firm be retained to provide further engineering services during design, implementation, and/or construction of any remedial measures, if necessary. This is to observe compliance with the concepts and recommendations contained herein and to allow design changes in the event that subsurface conditions differ from those anticipated.

i:\jobs\23441\geohydro.doc

APPENDIX B

BORING LOGS

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Burgess Mill - Nexfor
Berlin, New Hampshire

Boring No.: GZ-1
Page: 1 of 1
File No.: 23441
Check:

Contractor: New Hampshire Boring, Inc.
Foreman: Jay Garside
Logged by: Michael Filler
Date Start/Finish: 10-14-03 / 10-14-03
Boring Location: See Exploration Location Plan
GS Elev.: 1030.7 ft Datum: NGVD

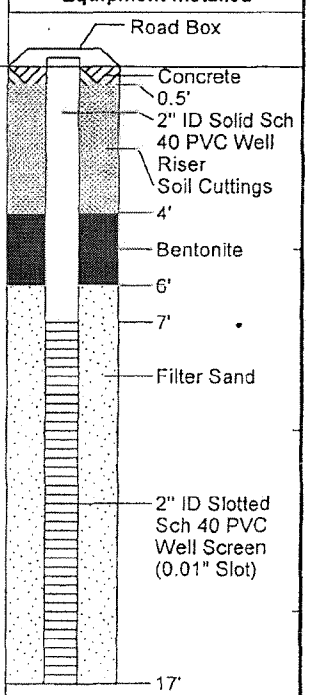
	Auger/ Casing	Sampler
Type:	HW	SS
I.D.:	4 in	1.37 in
Hammer Wt.:	300 lb	140 lb
Hammer Fall:	24 in	30 in
Rig Type:	CME 750	

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
10/14/03	10:45	7.0 ft	Well	45 mins.
11/6/03	12:15	6.9 ft	Well	23 days

Depth (ft)	Sample Information: No.	Pen./ Rec. (in)	Depth (ft)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Remarks
	S-1	24/ 12	0.5- 2.5	32-45 32-32	0.3	Very dense, brown/black, fine to coarse SAND, some Gravel, trace (+) Silt. Fill.	ASPHALT 0.3 ft	1
5	S-2	24/ 12	5.0- 7.0	2-2 1-2	1.9	Very loose, black, fine to coarse SAND, some Gravel, trace Silt, Ash. Fill.	FILL	
10	S-3	24/ 8	10.0- 12.0	2-1 1-2	0.6	Very loose, black, fine to coarse SAND, some Gravel, trace (+) Silt, Ash. Fill.		
15	S-4	24/ 12	15.0- 17.0	1/12" 5-7	1.0	Loose, black, fine to coarse SAND, some Gravel, little Silt, Ash. Fill.		
						Bottom of boring at 17 feet below ground surface.	17.0 ft BEDROCK	2
20								
25								

Equipment Installed



REMARKS

1. Soil samples were screened for total volatile organic compounds (VOCs) using a TEI Model 580B organic vapor meter referenced to an isobutylene-in-air standard. Total VOCs detected are reported in parts per million (ppm) in the "Field Test Data" column. "ND" indicates no VOCs detected.
2. Bedrock encountered at 17 feet below ground surface.

All depth measurements are approximate. Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-1

SOIL BL WELL LOGS BURGESS.GPJ GZA_NH.GDT 12/11/03

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Burgess Mill - Nexfor
Berlin, New Hampshire

Boring No.: GZ-2
Page: 1 of 1
File No.: 23441
Check:

Contractor: New Hampshire Boring, Inc.
Foreman: Jay Garside
Logged by: Michael Filler
Date Start/Finish: 10-14-03 / 10-14-03
Boring Location: See Exploration Location Plan
GS Elev.: 1038.1 ft Datum: NGVD

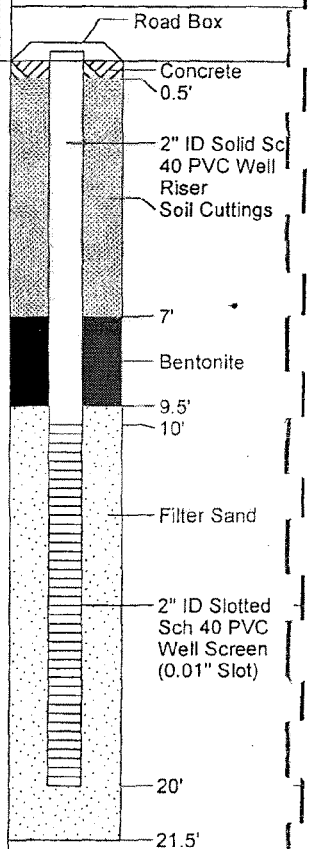
	Auger/ Casing	Sampler
Type:	HW	SS
I.D.:	4 in	1.37 in
Hammer Wt.:	300 lb	140 lb
Hammer Fall:	24 in	30 in
Rig Type:	CME 750	

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
10/14/03	1:15	10.0 ft	Well	15 min
11/6/03	12:20	8.9 ft	Well	23 days

Depth (ft)	Sample Information: No.	Pen / Rec. (in)	Depth (ft)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Remarks
0	S-1	24/ 18	0.5- 2.5	30-40 38-24	ND	Very dense, dark brown/black, fine to coarse SAND, some Gravel, trace Silt, Quartz present. Fill.	ASPHALT 0.5 ft	1
5	S-2	24/ 13	5.0- 7.0	10-9 6-6	ND	Medium dense, black, fine to coarse SAND, some Gravel, trace Silt, Ash. Fill.	FILL	2 3
10							9.5 ft	
15							BEDROCK	
20						Bottom of boring at 21.5 feet below ground surface.	21.5 ft	
25								

Equipment Installed



REMARKS

1. Soil samples were screened for total volatile organic compounds (VOCs) using a TEI Model 580B organic vapor meter referenced to an isobutylene-in-air standard. Total VOCs detected are reported in parts per million (ppm) in the "Field Test Data" column. "ND" indicates no VOCs detected.
2. Rock lodged in split spoon tip.
3. Split spoon refusal encountered at 9.5 feet below ground surface. Switched from wash and drive to air hammer at this depth.

All depth measurements are approximate. Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-2

SOIL BL WELL LOGS BURGESS.GPJ GZA_NH.GDT 12/9/03

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Burgess Mill - Nexfor
Berlin, New Hampshire

Boring No.: GZ-3
Page: 1 of 1
File No.: 23441
Check:

Contractor: New Hampshire Boring, Inc.
Foreman: Jay Garside
Logged by: Michael Filler
Date Start/Finish: 10-14-03 / 10-14-03
Boring Location: See Exploration Location Plan
GS Elev.: 1038.1 ft Datum: NGVD

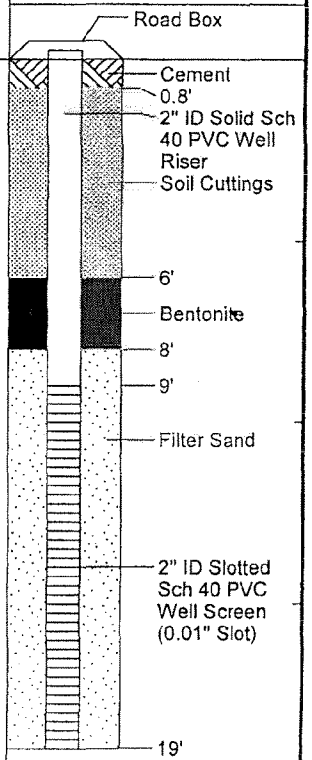
	Auger/ Casing	Sampler
Type:	HW	SS
I.D.:	4 in	1.37 in
Hammer Wt.:	300 lb	140 lb
Hammer Fall:	24 in	30 in
Rig Type:	CME 750	

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
10/14/03	3:45	14.0 ft	Well	10 mins.
11/6/03	12:25	9.9 ft	Well	23 days

Depth (ft)	Sample Information: No.	Pen./ Rec. (in)	Depth (ft)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Remarks
							ASPHALT	
	S-1	24/ 12	0.8- 2.8	24-18 19-15	ND	Dense, brown/black, fine to coarse SAND, some Gravel, trace Silt, Ash. Fill.	0.8 ft FILL	1
5	S-2	24/ 4	5.0- 7.0	1/12" 1-1	ND	Very loose, light brown/black, fine to coarse SAND, some Gravel, trace Silt, Ash and Metal Slag. Fill.	7.5 ft BEDROCK	2
10								
15								
						Bottom of boring at 19 feet below ground surface.	19.0 ft	
20								
25								

Equipment Installed



REMARKS

1. Soil samples were screened for total volatile organic compounds (VOCs) using a TEI Model 580B organic vapor meter referenced to an isobutylene-in-air standard. Total VOCs detected are reported in parts per million (ppm) in the "Field Test Data" column. "ND" indicates no VOCs detected.
2. Bedrock encountered at 7.5 feet below ground surface.

All depth measurements are approximate. Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-3

SOIL BL WELL LOGS BURGESS.GPJ GZA_NH.GDT 12/11/03

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Burgess Mill - Nexfor
Berlin, New Hampshire

Boring No.: GZ-4
Page: 1 of 1
File No.: 23441
Check:

Contractor: New Hampshire Boring, Inc.
Foreman: Jay Garside
Logged by: Michael Filler
Date Start/Finish: 10-15-03 / 10-16-03
Boring Location: See Exploration Location Plan
GS Elev.: 1109.1 ft **Datum:** NGVD

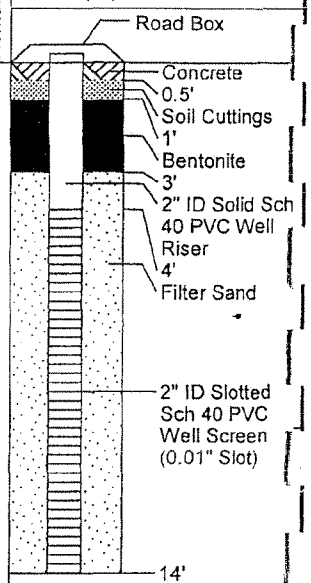
	Auger/ Casing	Sampler
Type:	HW	SS
I.D.:	4 in	1.37 in
Hammer Wt.:	300 lb	140 lb
Hammer Fall:	24 in	30 in
Rig Type:	CME 750	

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
10/16/03	7:05	7.0 ft	Well	14 hrs.
11/6/03	8:00	6.3 ft	Well	21 days

Depth (ft)	Sample Information: No.	Pen./ Rec. (in)	Depth (ft)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Remarks
	S-1	24/ 7	0.0- 2.0	2-12 14-19	ND	Medium dense, brown, fine to coarse SAND, some Gravel, trace Silt, Wood chips. Fill.	WOOD 0.5 ft	1
5	S-2	19/ 15	5.0- 6.6	8-12 32-22/1"	1.0	Dense, dark brown/black, fine to coarse SAND and Gravel, trace Silt, Wood chips. Fill.	FILL	2
10	S-3	17/ 10	11.0- 12.4	21-14 28/5"	ND	Very dense, brown/olive, fine to medium SAND, little (+) Gravel, trace Silt. Wet.	11.0 ft SAND	3
15						Bottom of boring at 14 feet below ground surface.	14.0 ft BEDROCK	
20								
25								

Equipment Installed



REMARKS

1. Soil samples were screened for total volatile organic compounds (VOCs) using a TEI Model 580B organic vapor meter referenced to an isobutylene-in-air standard. Total VOCs detected are reported in parts per million (ppm) in the "Field Test Data" column. "ND" indicates no VOCs detected.
2. Split spoon refusal encountered at 6.5 feet below ground surface. "Air-hammered" to 11 feet below ground surface.
3. Washwater color changed at 11 feet below ground surface from brown to light gray/olive.

All depth measurements are approximate. Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-4

SOIL BL WELL LOGS BURGESS.GPJ GZA_NH.GDT 12/11/03

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Burgess Mill - Nexfor
Berlin, New Hampshire

Boring No.: GZ-5
Page: 1 of 1
File No.: 23441
Check:

Contractor: New Hampshire Boring, Inc.
Foreman: Jay Garside
Logged by: Michael Filler
Date Start/Finish: 10-16-03 / 10-16-03
Boring Location: See Exploration Location Plan
GS Elev.: 1087.3 ft Datum: NGVD

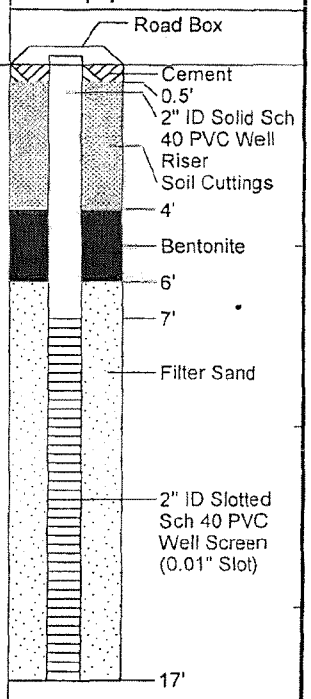
	Auger/ Casing	Sampler
Type:	HW	SS
I.D.:	4 in	1.37 in
Hammer Wt.:	300 lb	140 lb
Hammer Fall:	24 in	30 in
Rig Type:	CME 750	

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
10/16/03	10:17	3.8 ft	13.5 ft	10 mins.
10/16/03	10:28	3.8 ft	13.5 ft	21 mins.
10/16/03	10:48	3.8 ft	13.5 ft	41 mins.
10/16/03	12:02	4.5 ft	13.5 ft	115 mins.
11/6/03	10:35	4.2 ft	Well	21 days

Depth (ft)	Sample Information: No.	Pen./ Rec. (in)	Depth (ft)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Remarks
	S-1A/B	24/ 14	0.0- 2.0	19-15 15-8	ND	Medium dense, gray to black, fine to coarse SAND, some Gravel, trace Silt. Fill.		1
5	S-2	24/ 3	5.0- 7.0	5-3 3-4	0.5	Loose, dark brown, fine to coarse SAND, little (+) Gravel, trace Silt, Quartz fragments present. Wood in washwater.	FILL	
								2
10	S-3	24/ 4	10.0- 12.0	9-28 33-25	0.5	Very dense, olive, fine to coarse GRAVEL, some (+) Sand, little (+) Silt. Wet.	10.0 ft GRAVEL	
15	S-4	24/ 8	15.0- 17.0	25-31 24-24	0.3	Very dense, olive/gray, fine to coarse GRAVEL, some (+) Sand, trace (+) Silt. Wet.		
						Bottom of boring at 17 feet below ground surface.	17.0 ft	
20								
25								

Equipment Installed



REMARKS

1. Soil samples were screened for total volatile organic compounds (VOCs) using a TEI Model 580B organic vapor meter referenced to an isobutylene-in-air standard. Total VOCs detected are reported in parts per million (ppm) in the "Field Test Data" column. "ND" indicates no VOCs detected.
2. Casing refusal encountered at 13.5 feet below ground surface.

All depth measurements are approximate. Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-5

SOIL BL WELL LOGS BURGESS.GPJ GZA_NH.GDT 12/9/03

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Burgess Mill - Nexfor
Berlin, New Hampshire

Boring No.: GZ-6
Page: 1 of 1
File No.: 23441
Check:

Contractor: New Hampshire Boring, Inc.
Foreman: Jay Garside
Logged by: Michael Filler
Date Start/Finish: 10-16-03 / 10-16-03
Boring Location: See Exploration Location Plan
GS Elev.: 1086.1 ft Datum: NGVD

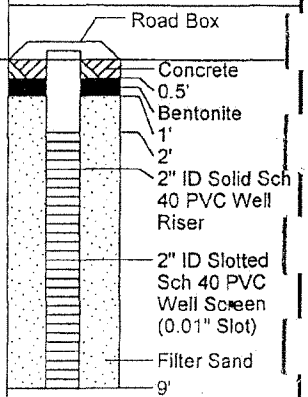
	Auger/ Casing	Sampler
Type:	HW	SS
I.D.:	4 in	1.37 in
Hammer Wt.:	300 lb	140 lb
Hammer Fall:	24 in	30 in
Rig Type:	CME 750	

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
11/6/03	10:40	3.1 ft	Well	21 days

Depth (ft)	Sample Information: No.	Pen./ Rec. (in)	Depth (ft)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Remarks
0	S-1A/B	24/ 14	0.0- 2.0	26-18 14-15	ND	Dense, gray/olive, fine to coarse SAND, some Gravel, trace Silt. Bottom of split spoon wet.		1
5	S-2	24/ 1	5.0- 7.0	2-2 1-1	ND	Very loose, dark brown, fine to coarse SAND, some Gravel, some (+) Silt. Wet.	SAND	
10						Bottom of boring at 9 feet below ground surface.	9.0 ft BEDROCK	
15								
20								
25								

Equipment Installed



REMARKS

1. Soil samples were screened for total volatile organic compounds (VOCs) using a TEI Model 580B organic vapor meter referenced to an isobutylene-in-air standard. Total VOCs detected are reported in parts per million (ppm) in the "Field Test Data" column. "ND" indicates no VOCs detected.

All depth measurements are approximate. Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-6

SOIL BL WELL LOGS BURGESS.GPJ GZA_NH.GDT 12/11/03

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Burgess Mill - Nexfor
Berlin, New Hampshire

Boring No.: GZ-7
Page: 1 of 1
File No.: 23441
Check:

Contractor: New Hampshire Boring, Inc.
Foreman: Jay Garside
Logged by: Michael Filler
Date Start/Finish: 10-16-03 / 10-16-03
Boring Location: See Exploration Location Plan
GS Elev.: 1086.0 ft Datum: NGVD

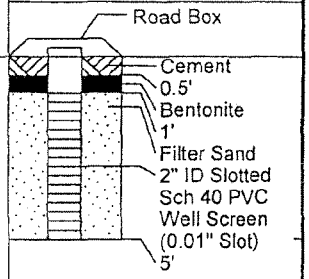
	Auger/ Casing	Sampler
Type:	HW	SS
I.D.:	4 in	1.37 in
Hammer Wt.:	300 lb	140 lb
Hammer Fall:	24 in	30 in
Rig Type:	CME 750	

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
11/6/03	10:45	1.8 ft	Well	21 days

Depth (ft)	Sample Information: No.	Pen./ Rec. (in)	Depth (ft)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Remarks
	S-1	24/ 14	0.0- 2.0	5-6 6-7	ND	Medium dense, dark brown/black, fine to coarse SAND, some Gravel, trace (+) Silt.	SAND	1
5						Bottom of boring at 5 feet below ground surface.	5.0 ftBEDROCK	2

Equipment Installed



REMARKS

1. Soil samples were screened for total volatile organic compounds (VOCs) using a TEI Model 580B organic vapor meter referenced to an isobutylene-in-air standard. Total VOCs detected are reported in parts per million (ppm) in the "Field Test Data" column. "ND" indicates no VOCs detected.
2. Casing refusal encountered at 5 feet below ground surface.

All depth measurements are approximate. Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-7

SOIL BL WELL LOGS BURGESS.GPJ GZA NH.GDT 12/9/03

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Burgess Mill - Nexfor
Berlin, New Hampshire

Boring No.: GZ-8
Page: 1 of 1
File No.: 23441
Check:

Contractor: New Hampshire Boring, Inc.
Foreman: Jay Garside
Logged by: Michael Filler
Date Start/Finish: 10-16-03 / 10-17-03
Boring Location: See Exploration Location Plan
GS Elev.: 1087.9 ft Datum: NGVD

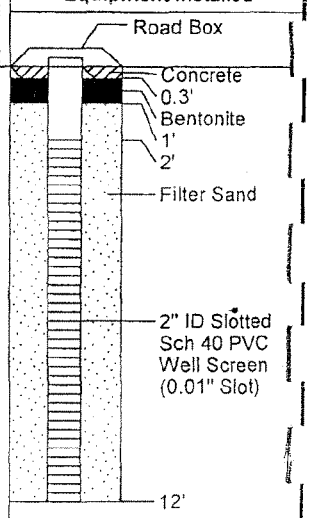
	Auger/ Casing	Sampler
Type:	HW	SS
I.D.:	4 in	1.37 in
Hammer Wt.:	300 lb	140 lb
Hammer Fall:	24 in	30 in
Rig Type:	CME 750	

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
11/6/03	10:55	4.2 ft	Well	20 days

Depth (ft)	Sample Information: No.	Pen./ Rec. (in)	Depth (ft)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Remarks
	S-1	24/ 22	0.0- 2.0	13-20 19-24	ND	Dense, dark brown/gray/orange, fine to coarse SAND, some Gravel, little (-) Silt.		1
5	S-2	24/ 14	5.0- 7.0	9-4 4-3	ND	Loose, brown/orange, fine to coarse SAND, some Gravel, trace Silt. Wet.	SAND AND GRAVEL	
10	S-3	24/ 18	10.0- 12.0	2-10 9-11	ND	Medium dense, gray/olive, SILT, some (+) fine to coarse Sand, little (-) Gravel. Wet.	10.0 ft SILT	
						Bottom of boring at 12 feet below ground surface.	12.0 BEDROCK	2
15								
20								
25								

Equipment Installed



REMARKS

1. Soil samples were screened for total volatile organic compounds (VOCs) using a TEI Model 580B organic vapor meter referenced to an isobutylene-in-air standard. Total VOCs detected are reported in parts per million (ppm) in the "Field Test Data" column. "ND" indicates no VOCs detected.
2. Casing refusal encountered at 12 feet below ground surface.

All depth measurements are approximate. Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-8

SOIL BL WELL LOGS BURGESS.GPJ GZA_NH.GDT 12/9/03

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Burgess Mill - Nexfor
Berlin, New Hampshire

Boring No.: GZ-9
Page: 1 of 1
File No.: 23441
Check:

Contractor: New Hampshire Boring, Inc.
Foreman: Jay Garside
Logged by: Michael Filler
Date Start/Finish: 10-17-03 / 10-17-03
Boring Location: See Exploration Location Plan
GS Elev.: 1090.1 ft Datum: NGVD

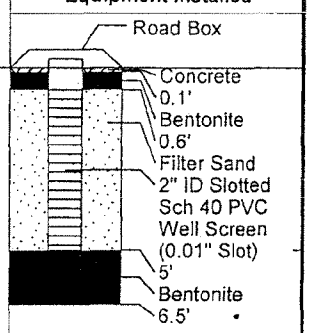
	Auger/ Casing	Sampler
Type:	HW	SS
I.D.:	4 in	1.37 in
Hammer Wt.:	300 lb	140 lb
Hammer Fall:	24 in	30 in
Rig Type:	CME 750	

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
11/6/03	11:00	1.7 ft	Well	20 days

Depth (ft)	Sample Information: No.	Pen./ Rec. (in)	Depth (ft)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Remarks
0	S-1	24/ 14	0.0- 2.0	10-14 34-20	ND	Dense, brown/light gray, fine to coarse SAND, some Gravel, little (+) Silt, varved. Moist.	SAND AND GRAVEL	1
5	S-2	24/ 9	5.0- 7.0	38-46 111-84	ND	Very dense, olive, fine to coarse SAND, some Gravel, some (+) Silt. Wet.	5.0 ftBEDROCK	2
						Bottom of boring at 6.5 feet below ground surface.		
10								
15								
20								
25								

Equipment Installed



REMARKS

1. Soil samples were screened for total volatile organic compounds (VOCs) using a TEI Model 580B organic vapor meter referenced to an isobutylene-in-air standard. Total VOCs detected are reported in parts per million (ppm) in the "Field Test Data" column. "ND" indicates no VOCs detected.
2. Casing refusal encountered at 5 feet below ground surface. The driller advanced the roller bit approximately 1.5 feet into bedrock.

All depth measurements are approximate. Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-9

SOIL BL WELL LOGS BURGESS.GPJ GZA_NH.GDT 12/9/03

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Burgess Mill - Nexfor
Berlin, New Hampshire

Boring No.: GZ-10
Page: 1 of 1
File No.: 23441
Check:

Contractor: New Hampshire Boring, Inc.
Foreman: Jay Garside
Logged by: Michael Filler
Date Start/Finish: 10-17-03 / 10-21-03
Boring Location: See Exploration Location Plan
GS Elev.: 1087.2 ft Datum: NGVD

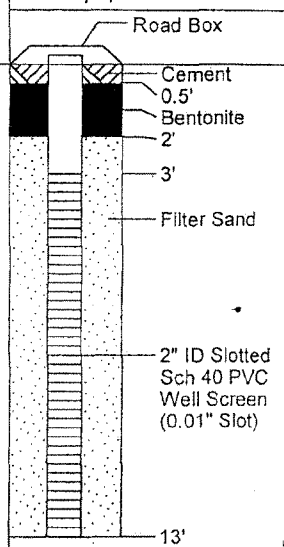
	Auger/ Casing	Sampler
Type:	HW	SS
I.D.:	4 in	1.37 in
Hammer Wt.:	300 lb	140 lb
Hammer Fall:	24 in	30 in
Rig Type:	CME 750	

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
11/6/03	10:30	3.8 ft	Well	16 days

Depth (ft)	Sample Information: No.	Pen./ Rec. (in)	Depth (ft)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Remarks
0	S-1	24/ 8	0.0- 2.0	4-8 6-10	ND	Medium dense, dark brown/brown, fine to coarse SAND, some Gravel, trace (+) Silt. Moist.	SAND AND GRAVEL	1
5								2
							6.0 ft	
10							COBBLES AND BOULDERS	
						Bottom of boring at 13 feet below ground surface.	13.0 ft PROBABLE BEDROCK	3
15								
20								
25								

Equipment Installed



REMARKS

1. Soil samples were screened for total volatile organic compounds (VOCs) using a TEI Model 580B organic vapor meter referenced to an isobutylene-in-air standard. Total VOCs detected are reported in parts per million (ppm) in the "Field Test Data" column. "ND" indicates no VOCs detected.
2. Sampling discontinued due to weather conditions affecting safety of cat head.
3. Roller-bit refusal at 13 feet below ground surface.

All depth measurements are approximate. Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-10

SOIL BL WELL LOGS BURGESS.GPJ GZA_NH.GDT 12/11/03

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Burgess Mill - Nexfor
Berlin, New Hampshire

Boring No.: GZ-11
Page: 1 of 1
File No.: 23441
Check:

Contractor: New Hampshire Boring, Inc.
Foreman: Jay Garside
Logged by: Michael Filler
Date Start/Finish: 10-20-03 / 10-20-03
Boring Location: See Exploration Location Plan
GS Elev.: 1085.3 ft Datum: NGVD

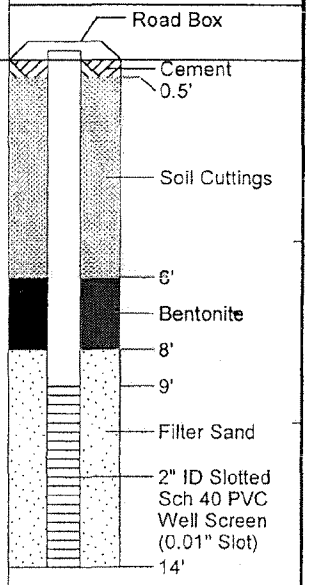
	Auger/ Casing	Sampler
Type:	HW	SS
I.D.:	4 in	1.37 in
Hammer Wt.:	300 lb	140 lb
Hammer Fall:	24 in	30 in
Rig Type:	CME 750	

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
11/6/03	10:20	7.3 ft	Well	16 days

Depth (ft)	Sample Information: No.	Pen./ Rec. (in)	Depth (ft)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Remarks
	S-1	24/ 8	0.0- 2.0	4-4 2-2	ND	Loose, dark brown/black, fine to coarse SAND, little (-) Gravel, trace Silt, Ash, Fill. Dry.	SAND AND ASH FILL	1
							2.5 ft	2
5	S-2	12/ 4	6.0- 7.0	23-35 50/0"	ND	Very dense, light gray/brown, fine to coarse SAND, some Gravel, little (-) Silt, Cobbles. Dry.	SAND, COBBLES, AND BOULDERS	3
	S-3	24/ 16	9.0- 11.0	24-35 35-50	ND	Very dense, olive, fine to coarse SAND, some Gravel, some (+) Silt. Wet.		
10								
15						Bottom of boring at 14 feet below ground surface.	14.0 ft PROBABLE BEDROCK	4
20								
25								

Equipment Installed



REMARKS

1. Soil samples were screened for total volatile organic compounds (VOCs) using a TEI Model 580B organic vapor meter referenced to an isobutylene-in-air standard. Total VOCs detected are reported in parts per million (ppm) in the "Field Test Data" column. "ND" indicates no VOCs detected.
2. Casing refusal encountered at 2.5 feet below ground surface. Switched from wash and drive to air hammer.
3. Split spoon refusal encountered at 7 feet below ground surface. Probable boulder from 7 to 8.5 feet.
4. Competant material encountered at 14 feet below ground surface.

All depth measurements are approximate. Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-11

SOIL BL WELL LOGS BURGESS.GPJ GZA_NH.GDT 12/11/03

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Burgess Mill - Nexfor
Berlin, New Hampshire

Boring No.: GZ-12
Page: 1 of 1
File No.: 23441
Check:

Contractor: New Hampshire Boring, Inc.
Foreman: Jay Garside
Logged by: Michael Filler
Date Start/Finish: 10-20-03 / 10-21-03
Boring Location: See Exploration Location Plan
GS Elev.: 1073.6 ft Datum: NGVD

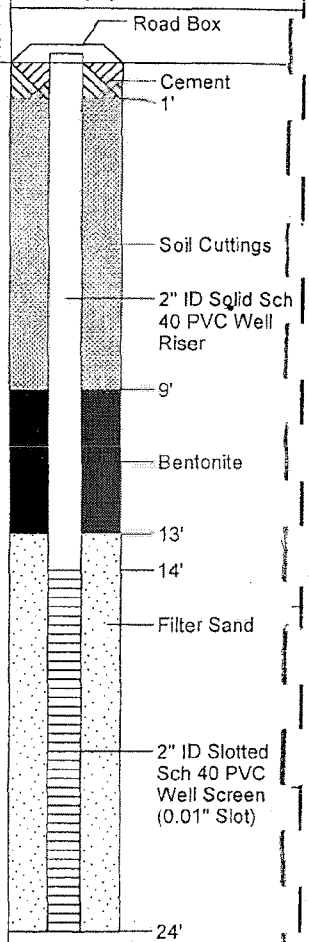
	Auger/ Casing	Sampler
Type:	HW	SS
I.D.:	4 in	1.37 in
Hammer Wt.:	300 lb	140 lb
Hammer Fall:	24 in	30 in
Rig Type:	CME 750	

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
11/6/03	10:15	17.1 ft	Well	16 days

Depth (ft)	Sample Information: No.	Pen./ Rec. (in)	Depth (ft)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Remarks
	S-1	24/ 10	0.0- 2.0	4-6 9-15	ND	Medium dense, brown, fine to medium SAND, little (-) Gravel, trace (+) Silt, layer of organics in top 2" of sample. Moist.		1 2
5	S-2	16/ 8	5.0- 6.3	19-21 50/4"	ND	Very dense, brown, fine to coarse SAND, some Gravel, trace Silt, Cobbles. Moist.	SAND AND GRAVEL	
10	S-3	24/ 16	10.0- 12.0	16-23 9-35	ND	Dense, gray, fine to coarse SAND, some Gravel, trace Silt. Dry.	12.0 ft	3
15							PROBABLE BEDROCK	
20								
25						Bottom of boring at 24 feet below ground surface	24.0 ft	

Equipment Installed



REMARKS

1. Soil samples were screened for total volatile organic compounds (VOCs) using a TEI Model 580B organic vapor meter referenced to an isobutylene-in-air standard. Total VOCs detected are reported in parts per million (ppm) in the "Field Test Data" column. "ND" indicates no VOCs detected.
2. Rock lodged in split spoon tip.
3. Rock lodged in split spoon tip. Sample is predominantly fine cuttings from boulder.

All depth measurements are approximate. Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-12

SOIL BL WELL LOGS BURGESS.GPJ GZA_NH.GDT 12/9/03

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Burgess Mill - Nexfor
Berlin, New Hampshire

Boring No.: GZ-13
Page: 1 of 1
File No.: 23441
Check:

Contractor: New Hampshire Boring, Inc.
Foreman: Jay Garside
Logged by: Michael Filler
Date Start/Finish: 10-21-03 / 10-22-03
Boring Location: See Exploration Location Plan
GS Elev.: 1065.9 ft **Datum:** NGVD

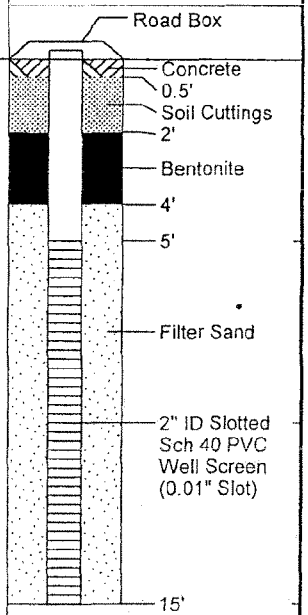
	Auger/ Casing	Sampler
Type:	HW	SS
I.D.:	4 in	1.37 in
Hammer Wt.:	300 lb	140 lb
Hammer Fall:	24 in	30 in
Rig Type:	CME 750	

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
11/6/03	10:00	6.6 ft	Well	15 days

Depth (ft)	Sample Information: No.	Pen./ Rec. (in)	Depth (ft)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Remarks
	S-1	24/ 14	0.0- 2.0	6-11 10-10	ND	Medium dense, brown/dark brown, fine to coarse SAND, some Gravel, little (+) Silt. Moist.		1
5	S-2	24/ 1	5.0- 7.0	45-2 6-10	ND	Loose, gray/orange, fine to coarse SAND, some Gravel, trace Silt, Cobbles. Moist.	SAND AND GRAVEL	
10								
15						Bottom of boring at 15 feet below ground surface.	15.0 ft	
20								
25								

Equipment Installed



REMARKS

1. Soil samples were screened for total volatile organic compounds (VOCs) using a TEI Model 580B organic vapor meter referenced to an isobutylene-in-air standard. Total VOCs detected are reported in parts per million (ppm) in the "Field Test Data" column. "ND" indicates no VOCs detected.

All depth measurements are approximate. Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-13

SOIL BL WELL LOGS BURGESS.GPJ GZA NH GDT 12/9/03

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Burgess Mill - Nexfor
Berlin, New Hampshire

Boring No.: GZ-14
Page: 1 of 1
File No.: 23441
Check:

Contractor: New Hampshire Boring, Inc.
Foreman: Jay Garside
Logged by: Michael Filler
Date Start/Finish: 10-22-03 / 10-22-03
Boring Location: See Exploration Location Plan
GS Elev.: 1054.2 ft Datum: NGVD

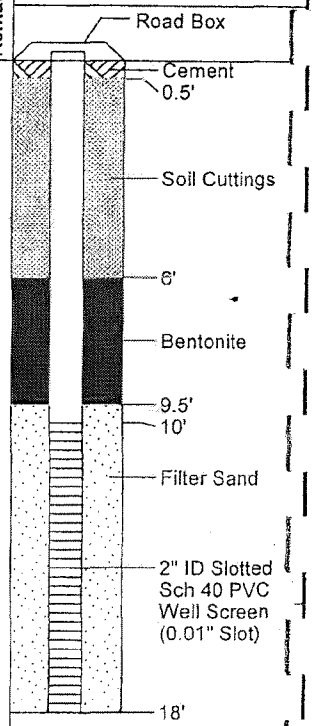
	Auger/ Casing	Sampler
Type:	HW	SS
I.D.:	4 in	1.37 in
Hammer Wt.:	300 lb	140 lb
Hammer Fall:	24 in	30 in
Rig Type:	CME 750	

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
11/6/03	13:30	5.8 ft	Well	15 day

Depth (ft)	Sample Information: No.	Pen./ Rec. (in)	Depth (ft)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Remarks
0	S-1	24/ 14	0.0- 2.0	25-48 50-50/1"	0.3	Very dense, brown, fine to coarse SAND, some (+) Gravel, trace Silt, Cobbles. Dry.	SAND AND GRAVEL	1, 2
5	S-2	24/ 0	5.0- 7.0	10-12 4-15	NA	No recovery.		3, 4
9.0 ft							PROBABLE BEDROCK	
10								
15								
18.0 ft						Bottom of boring at 18 feet below ground surface.		
20								
25								

Equipment Installed



REMARKS

1. Soil samples were screened for total volatile organic compounds (VOCs) using a TEI Model 580B organic vapor meter referenced to an isobutylene-in-air standard. Total VOCs detected are reported in parts per million (ppm) in the "Field Test Data" column. "ND" indicates no VOCs detected.
2. Rock lodged in split spoon tip.
3. Rock lodged in split spoon tip.
4. Boulders and cobbles encountered from 6 to 9 feet below ground surface.

All depth measurements are approximate. Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-14

SOIL BL WELL LOGS BURGESS.GPJ GZA_NH.GDT 12/9/03

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Burgess Mill - Nexfor
Berlin, New Hampshire

Boring No.: GZ-15
Page: 1 of 1
File No.: 23441
Check:

Contractor: New Hampshire Boring, Inc.
Foreman: Jay Garside
Logged by: Michael Filler
Date Start/Finish: 10-22-03 / 10-22-03
Boring Location: See Exploration Location Plan
GS Elev.: 1046.5 ft Datum: NGVD

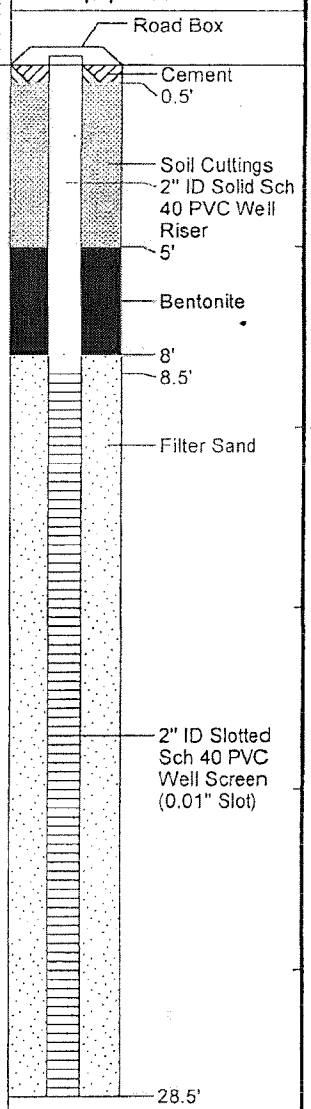
	Auger/ Casing	Sampler
Type:	HW	SS
I.D.:	4 in	1.37 in
Hammer Wt.:	300 lb	140 lb
Hammer Fall:	24 in	30 in
Rig Type:	CME 750	

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
10/22/03	10:15	25.0 ft	Well	20 mins.
11/6/03	13:20	24.5 ft	Well	15 days

Depth (ft)	Sample Information: No.	Pen./ Rec. (in)	Depth (ft)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Remarks
	S-1	24/ 11	0.0- 2.0	12-16 16-16	0.9	Dense, brown/gray, fine to coarse SAND, some (+) Gravel, trace Silt. Dry. Fill.	SAND AND GRAVEL FILL	1
5	S-2	24/ 10	5.0- 7.0	15-10 25-58	0.6	Dense, dark brown, fine to medium SAND, some (+) Gravel, Ash, building debris. Dry. Fill.	4.0 ft	2
10								3
15	S-3	24/ 1	14.0- 16.0	12-12 8-18	ND	Medium dense, brown, Wood, building debris, some Gravel. Wet. Fill.	SAND, GRAVEL, AND DEBRIS FILL	
20	S-4	24/ 0	19.0- 21.0	35/0"	NA	No recovery.		
25	S-5	24/ 5	24.0- 26.0	10-19 39-38	ND	Very dense, gray, fine SAND and Silt. Wet.	24.0 ft SAND AND SILT	
						Bottom of boring at 28.5 feet below ground surface.	28.5 ft	4

Equipment Installed



REMARKS

1. Soil samples were screened for total volatile organic compounds (VOCs) using a TEI Model 580B organic vapor meter referenced to an isobutylene-in-air standard. Total VOCs detected are reported in parts per million (ppm) in the "Field Test Data" column. "ND" indicates no VOCs detected.
2. Building debris, red brick, encountered from 4 to 5 feet below ground surface.
3. Sample of building debris/fill collected from cuttings. Debris included concrete and brick.
4. Dark cuttings from 27 to 28.5 feet below ground surface.

All depth measurements are approximate. Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-15

SOIL BL WELL LOGS BURGESS.GPJ GZA_NH.GDT 12/9/03

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Burgess Mill - Nexfor
Berlin, New Hampshire

Boring No.: GZ-16
Page: 1 of 1
File No.: 23441
Check:

Contractor: New Hampshire Boring, Inc.
Foreman: Jay Garside
Logged by: Michael Filler
Date Start/Finish: 10-22-03 / 10-22-03
Boring Location: See Exploration Location Plan
GS Elev.: 1040.6 ft **Datum:** NGVD

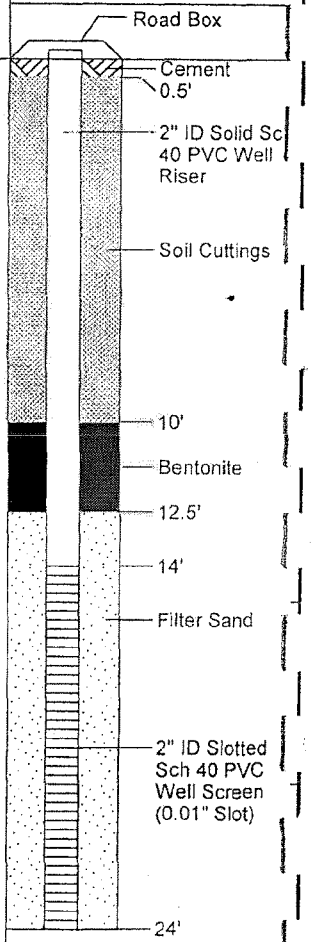
	Auger/ Casing	Sampler
Type:	HW	SS
I.D.:	4 in	1.37 in
Hammer Wt.:	300 lb	140 lb
Hammer Fall:	24 in	30 in
Rig Type:	CME 750	

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
11/6/03	13:00	20.7 ft	Well	15 day

Depth (ft)	Sample Information: No.	Pen./ Rec. (in)	Depth (ft)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Remarks
							ASPHALT 0.5 ft	
	S-1	24/ 10	0.5- 2.5	40-31 32-35	0.9	Very dense, brown, fine to coarse SAND, little (+) Gravel, trace Silt.	SAND	1
							4.0 ft	
5	S-2	24/ 2	5.0- 7.0	2-6 8-4	ND	Medium dense, dark brown, fine to coarse SAND, some Gravel, trace Silt, Wood. Moist.		
10	S-3	24/ 4	10.0- 12.0	6-17 35-30	ND	Very dense, dark brown/gray, fine to coarse SAND, some Gravel, trace Silt, Cobbles. Moist.	SAND AND GRAVEL	
15	S-4	24/ 0	15.0- 17.0	4-4 6-3	NA	No recovery.		
20	S-5	24/ 5	20.0- 22.0	6-22 15-20	ND	Dense, gray, GRAVEL, little (-) Sand, little (-) Silt. Wet.	20.0 ft GRAVEL	
25						Bottom of boring at 24 feet below ground surface.	24.0 ft	

Equipment Installed



REMARKS

1. Soil samples were screened for total volatile organic compounds (VOCs) using a TEI Model 580B organic vapor meter referenced to an isobutylene-in-air standard. Total VOCs detected are reported in parts per million (ppm) in the "Field Test Data" column. "ND" indicates no VOCs detected.

All depth measurements are approximate. Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Burgess Mill - Nexfor
Berlin, New Hampshire

Boring No.: GZ-17
Page: 1 of 3
File No.: 23441
Check:

Contractor: New Hampshire Boring, Inc.
Foreman: Jay Garside
Logged by: Michael Filler
Date Start/Finish: 10-23-03 / 10-23-03
Boring Location: See Exploration Location Plan
GS Elev.: 1051.7 ft Datum: NGVD

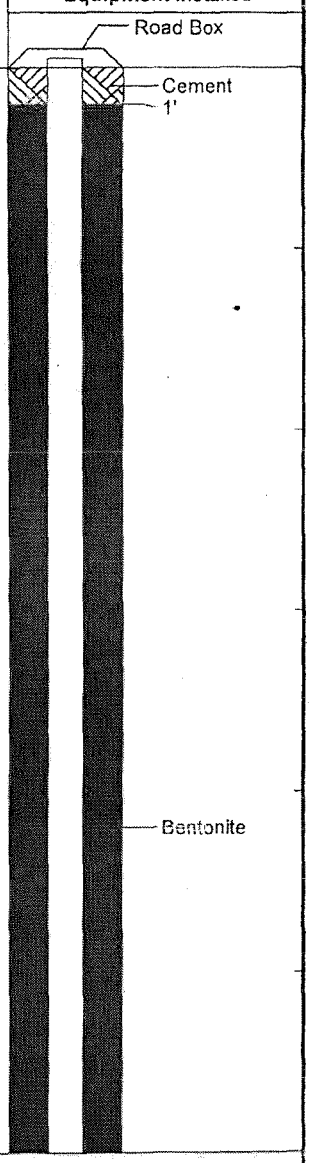
	Auger/ Casing	Sampler
Type:	HW	SS
I.D.:	4 in	1.37 in
Hammer Wt.:	300 lb	140 lb
Hammer Fall:	24 in	30 in
Rig Type:	CME 750	

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
11/6/03	12:50	35.1 ft	Well	14 days

Depth (ft)	Sample Information: No.	Pen./ Rec. (in)	Depth (ft)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Remarks
	S-1	24/ 12	0.0- 2.0	28-40 47-46	ND	Very dense, brown, fine to coarse SAND, some Gravel, trace Silt. Dry.	SAND AND GRAVEL	1
5	S-2	1/ 1	4.0- 4.1	35/1"	ND	Very dense, gray, Cobbles.	5.0 ft	
10								
15							BEDROCK	
20								
25								

Equipment Installed



REMARKS

1. Soil samples were screened for total volatile organic compounds (VOCs) using a TEI Model 580B organic vapor meter referenced to an isobutylene-in-air standard. Total VOCs detected are reported in parts per million (ppm) in the "Field Test Data" column. "ND" indicates no VOCs detected.

All depth measurements are approximate. Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-17

SOIL_BL WELL LOGS BURGESS.GPJ GZA_NH.GDT 12/9/03

GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Burgess Mill - Nexfor
Berlin, New Hampshire

Boring No.: GZ-17
Page: 2 of 3
File No.: 23441
Check:

Depth (ft)	Sample Information: No.	Pen./ Rec. (in)	Depth (ft)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
35									2" ID Solid Sch 40 PVC Well Riser
40									41'
45							BEDROCK		Filter Sand
50									
55									56'
60									

REMARKS

All depth measurements are approximate. Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-17

SOIL BL WELL LOGS BURGESS.GPJ GZA_NH.GDT 12/9/03

GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Burgess Mill - Nexfor
Berlin, New Hampshire

Boring No.: GZ-17
Page: 3 of 3
File No.: 23441
Check:

Depth (ft)	Sample Information: No.	Pen./ Rec. (in)	Depth (ft)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
70							BEDROCK		2" ID Slotted Sch 40 PVC Well Screen (0.01" Slot)
75									76'
						Bottom of boring at 76 feet below ground surface.	76.0 ft		
80									
85									
90									
95									

REMARKS

All depth measurements are approximate. Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-17

SOIL BL WELL LOGS BURGESS.GPJ GZA_NH.GDT 12/9/03

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Burgess Mill - Nexfor
Berlin, New Hampshire

Boring No.: GZ-18
Page: 1 of 2
File No.: 23441
Check:

Contractor: New Hampshire Boring, Inc.
Foreman: Jay Garside
Logged by: Michael Filler
Date Start/Finish: 10-23-03 / 10-24-03
Boring Location: See Exploration Location Plan
GS Elev.: 1056.6 ft Datum: NGVD

	Auger/ Casing	Sampler
Type:	HW	SS
I.D.:	4 in	1.37 in
Hammer Wt.:	300 lb	140 lb
Hammer Fall:	24 in	30 in
Rig Type:	CME 750	

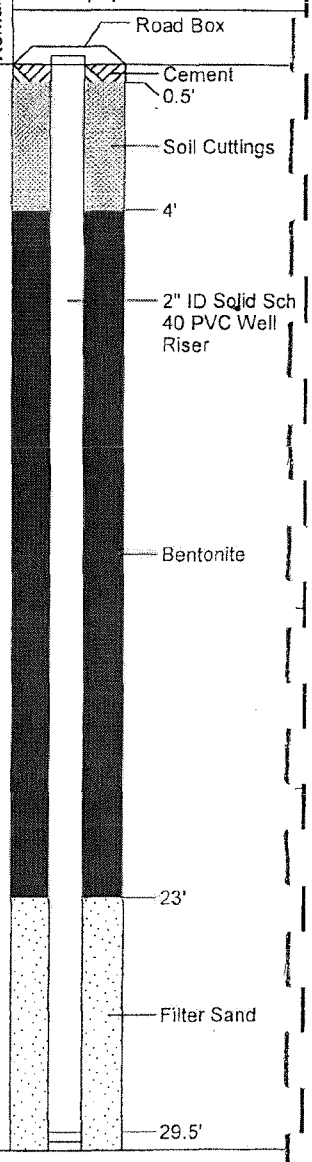
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
10/23/03	2:30	40.0 ft	15.0 ft	1 hr.
10/24/03	7:15	34.3 ft	15.0 ft	17 hrs.
11/6/03	12:40	32.5 ft	Well	13 days

Depth (ft)	Sample Information: No.	Pen./ Rec. (in)	Depth (ft)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.
	S-1	24/ 8	0.0- 2.0	15-21 50/5"	ND	Very dense, brown, fine to coarse SAND, some Gravel, little Silt. Dry.	
5	S-2	3/ 0	5.0- 5.3	35/3"	ND	Boulder. No recovery.	SAND AND GRAVEL
10	S-3	24/ 4	10.0- 12.0	4-8 5-10	ND	Medium dense, dark brown, fine to coarse SAND, some Gravel, trace Silt, weathered Rock, Ash. Dry.	12.5 ft
15							
20							BEDROCK
25							

Remarks

Equipment Installed



REMARKS

1. Soil samples were screened for total volatile organic compounds (VOCs) using a TEI Model 580B organic vapor meter referenced to an isobutylene-in-air standard. Total VOCs detected are reported in parts per million (ppm) in the "Field Test Data" column. "ND" indicates no VOCs detected.
2. Split spoon refusal at 1.5 feet below ground surface.
3. Rock lodged in split spoon tip.
4. Dark cuttings from 7 to 9 feet below ground surface.

All depth measurements are approximate. Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-18

SOIL BL WELL LOGS BURGESS.GPJ GZA_NH.GDT 12/9/03